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Experiments in Plaster to Test Compression of Model in Closing Flask.

By STEWART J. SPENCE, D.D.S., Hartiman, Conn.

The writer was first seriously impressed by the fact that plaster of paris is a compressible substance when, about seventeen years ago, while conducting experiments in celluloid, he found that a small piece of celluloid placed between the two halves of a flask filled with plaster would, on the flask being closed at 320° F., embed itself deeply in the plaster. (See Prof. Richardson's Mechanical Dentistry, article "Celluloid Base.")

That misfits may arise from a model of plaster of paris being compressed out of proper shape in closing flasks on rubber, especially when the plaster is newly set, and still more so when excess of rubber is present, is abundantly proven by the following experiments:

The lower half of a flask was filled with plaster, and shaken till level and smooth. On this the upper half was poured. Four hours later this flask was opened and a wad of vulcanizable red rubber of about fifteen grains in weight was placed between these halves and they were closed on it in hot water. No escape gates had been cut. To bring the two parts together required strong pressure. No rubber was seen to ooze out at the edges of the flask, and it was therefore evident that it had embedded itself in the plaster. Upon opening the flask the rubber was removed, and then the plaster of the lower section of flask was taken out entire (the flask having been previously oiled for this purpose) and was sawed asunder across, from guide-pin to guide-pin, thus exposing the center. This revealed a space made by the rubber between the two masses of plaster wide enough at its center to admit twenty thicknesses of the paper of the little books in which gold leaf comes to us. As forty thicknesses of this paper measures about one millimeter, this gave 0.5 millimeter as the extent of compression.

But the above was with "green" (i. e., newly mixed) plaster, and without waste-gates, and therefore the compression must have been greater than is common in actual practice. A second test was therefore made with plaster otherwise similar but given about twenty hours to harden, when only fourteen thicknesses of the paper could be inserted.

To test the compression of a plaster ridge in closing flasks on rubber, a section of ridge was made thus: A small sheet of tin, one by three-fourths of an inch in dimensions and one millimeter thick, was bent over a pencil into trough-shape and then embedded in plaster in the lower half of a flask near the heels. The upper plaster was then poured, and twenty-four hours allowed for hardening. On being opened the tin was removed, exhibiting the plaster ridge, a good representation of a lower jaw. Some metal was filed from the heel of the flask, and some plaster cut away, in order to give (when flask should be shut) access to the space made by removing the tin. The measurement of said space was then taken through this opening and found to be forty thicknesses of the foil paper. With careful avoidance of excess, rubber was then packed in this space, and the flask closed with hot water. On opening, the rubber was removed and the tin placed back on the ridge, when it was found that two thicknesses of the foil paper would go between the summit of ridge and the tin. This showed that a slight compression had taken place, even with an abundant waste gate at one end and with every precaution to prevent excess of rubber. In the next test a considerable excess of rubber was used and the flask closed again. In opening, the entire space (the tin not being replaced this time) admitted forty-four thicknesses of the paper, its original capacity, as we said, being forty. This demonstrated the ill effects of excess of rubber. But this had been made with an abundant escape gate, one end being wide open. In the next test this gate was closed up with plaster, and an excess of rubber was packed into the space, and the flask closed again. This time the space admitted forty-eight thicknesses of paper, showing the evil results of not providing escape gates. These tests gave 0.05 millimeter as the compression under the most favorable circumstances, and 0.2 millimeter under the least favorable.

If compression were equal all over the model it would probably be of benefit in cases where the model is made of an expansive plaster, because it would counteract this expansion by reducing through compression the size of the model. But it must be remembered that the pressure is not equally distributed over the model, but must fall more directly upon the confining palatal hollow than upon the buccal slopes, and also its influence must be greatest at points most remote from escape gates which in the upper model would be about the center of the palate and in the

lower the summit of ridge. Now, as a compression of the model means a corresponding protuberance of the vulcanite plate, this theory makes compression greatest at those points where we would prefer it to be least.

Again, in cases where, in waxing up, the teeth come in actual contact with the model, the compression must be greater than where there is a cushion of wax, and eventually rubber, between model and tooth; and so the resulting plate must be unevenly protuberant at these points. That this does occur is evident from the fact that although the dentist in waxing up often sets teeth directly on the model, yet they never appear bare in the plate, a film of vulcanite always covering them. Either these teeth

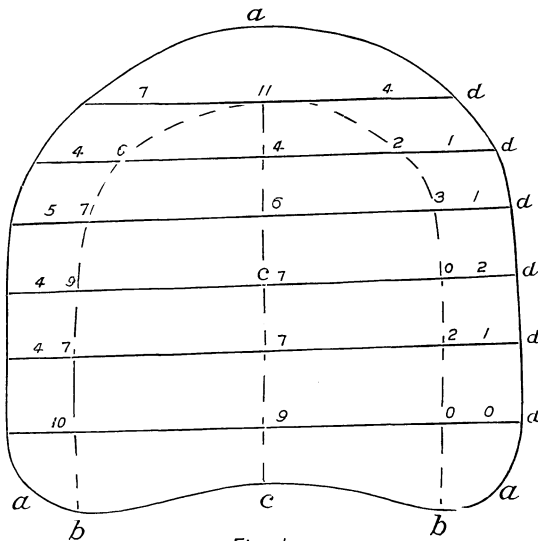


Fig. 1.

are forced into the "green" plaster of the investment, or the model is compressed by them, or both these evils occur.

To test the above theory of pressure falling most on the center of the palate, the following experiment was made. It showed, however, that excess of rubber in packing the case played a more important part in this matter than does remoteness from escape gates, etc.

Experiment 3. A sheet of tin about one millimeter thick was roughly shaped over an old model of an upper jaw to represent a wax base plate, minus teeth. This tin plate was embedded in plaster, palatal surface up, in the lower half of a flask, and then the upper half of the flask was filled over it. This investment was given till next morning to harden. It was then opened, and

the tin plate was removed. The space made by this removal was then filled with rubber, with slight excess, and seven gates cut. Closure was made with boiling water. The case was then opened and the rubber removed. The tin was replaced in the lower half of flask, and the plaster in the upper was removed entirely from the flask, and then it was gradually cut away by cross sections, commencing at the heels, cutting from heel to heel. At every quarter inch the cutting paused to take measurement of the compression. This measurement was made by inserting strips of foil paper between the tin plate and the model. Fig. 1 shows the result. In it *a a a* represent the buccal and labial borders, *b b b* the ridge, and the *c* line corresponds to the palatal suture, while *d d d d d d* indicate the six cross sections. The figures placed along these lines, or between them, give the number of strips of foil paper admitted between tin and plaster, at the points marked by the numbers, thus indicating the extent of compression.

The reader will see at a glance that the greatest compression, 11, is located at the locality of the central incisors. Also that the space at the buccal surfaces is least, that on the right side being almost nil. (The discrepancy between the two sides was caused by failure to fully close the flask on the right side.) Observe also the irregularity of these spaces, as where one of them jumps from 0 to 3. No doubt this was due to the rubber being thicker at 3 than 0. The vast discrepancy between 0 and 11 has something startling about it.

The moral to be drawn from these experiments is that compression of plaster of paris models in flask closing is a very serious matter—more serious than has been generally believed, and one that calls for remedy.

Various remedies suggested themselves to the

Remedies against writer's mind—(1) to use a more easy flowing rubber;
Compression. ber; (2) to increase escape gates; (3) to find some exact method of measuring the quantity of rubber

required by each case; (4) to close with dry heat, and thus get a higher temperature than boiling water for softening the rubber; (5) to use some solvent for rubber; (6) to increase the hardness of the model.

To amplify on these various remedies: (1) I found by experiment that there is a considerable difference in the packing qualities of various rubbers, some flowing more easily than others. As a rule those most adulterated have the easiest flow. (2) To increase escape gates; I not only made the usual ones more deep and numerous, but also drilled holes down through the investment from the palatal region to the top of the plaster and out at holes drilled in the upper lid of the flask. (3) After carefully measuring the rubber by the displacement of water method I would leave out a good sized piece of the measured rubber, closing the

flask without it, then reopen and at the place where an insufficiency appeared (if at all) add small pieces and close again. (4) I tried closing with dry heat in order to get higher temperature than that of boiling water, but I found that the temperature of plaster cannot be raised beyond 212° until the moisture in it has passed off in steam, which requires from one to two hours for an investment in flask. But a cast when thus dried is much harder, and if closed with dry heat is much less compressible. (5) I had learned from Dr. Eben Flagg that coal oil applied to a freshly cut surface of vulcanite aids in cohesion in repair cases, and I had noticed that a piece of vulcanizable rubber which fell into some coal oil spilled on my work table was much softened thereby; so I tried coal oil as a solvent for rubber in flask closing. An experiment much similar to that of No. 1 was made, both halves of a flask being filled with plaster. These were first closed in hot water on a piece of rubber, and great exertion was required to bring them together, and the rubber did not exude at their edges; then the same piece of rubber was soaked in coal oil and again closed down upon by the same two halves of the flask, this time without heat. The result was that the flask closed exceedingly easily, and the rubber oozed out at all sides at its edges. Of course, there was no compression of plaster now.

On seeing this I felt like Archimedes as he ran naked through the streets of Syracuse shouting "I have found it!" But, alas, I soon found that the dissolving of rubber in coal oil retards its vulcanization. Other solvents were then tried—chloroform, sulphuric ether, gasoline and benzine. Of these four, while all retarded vulcanization, benzine proved the best. Chloroform sometimes produced little pits in the vulcanite. Ether was not sufficiently active as a solvent, and when combined with benzine (one part ether to two parts benzine) it produced porosity. My present practice is to employ a mixture of one part benzine and two parts alcohol, dipping the rubber in this mixture, before packing it, and closing the flask with the additional aid of hot water. This does not appreciably retard vulcanization, and it makes flask closure a much easier operation. If, however, there is the slightest opening at a point, the rubber will penetrate it.

(6) My chief efforts were directed to hardening the model, and it was here that best success was achieved. A certain compound which I had been using as a substitute for plaster of paris has already yielded me non-expansive casts, and now, as a result of further patient research, I have obtained with it a hardness about five-fold that of plaster of paris and equal to Melotte's metal. With this strength of model, compression is eliminated.

A Tooth for a Tooth, and the Law of It.

By LOUIS LANDE, LL.B., Member of the New York Bar.

Many would have us believe that the great law-giver in uttering these words meant to express the severe punishment meted out in ancient times to those who were guilty of assault. But modern thinkers interpret it otherwise. To them this short statement is simply a description of "ye olden times" when men in their desire for mutual help and condolence pulled each other's teeth when occasion made resort to such violent measures necessary. Besides our ancestors had not the modern dread of such an operation.

While we would rather have cocaine for pain and gold filling for the cavity, the Israelites who spent forty summers in the mountains preferred extraction for the toothache.

The people of this generation have further come to recognize that the taking care of the health, and the treatment of the teeth, should no longer be left to barbers, watchmakers, blacksmiths, or whoever was possessed of such tools in his trade by which teeth could conveniently, if not comfortably, or even safely be pulled out, and have come to demand that dentistry be raised to the dignity of a profession with laws and rules of its own.

Almost every State in the Union now has laws forbidding the practice of dentistry without a license, which can only be obtained after due examination in the subjects prescribed by the particular Board of Dental Examiners.

Constitutionality of Dental Laws.

Of course, such stringent requirements were not always gracefully accepted by the candidates for dental honors and many attempts have been made to nullify these laws by asking the courts to declare them unconstitutional, unreasonable and oppressive, on the ground that they violate the constitutional provision guaranteeing to every person the right to follow any legitimate occupation; but without success.

A dentist is compelled to abide by the decision of the dental examiners of the State in which he desires to practice and to comply with all their requirements.

The nature and extent of the qualifications required must depend primarily upon the judgment of the Legislature. If they are appropriate to the profession and attainable by reasonable study, no objection to their validity can be raised because of their stringency. The only limit of the legislative power in prescribing conditions to the right to practice is that

they shall be reasonable. If a condition should be clearly arbitrary and capricious; if no reason with reference to the end in view can be assigned for it; and especially, if it appears that it must have been adopted for some other purpose, such for instance, as to favor or benefit some person or class of persons, it certainly would not be reasonable, and would be beyond the power of the Legislature to impose.

Thus a law passed in New Hampshire, in 1899, which excepted from its provisions requiring a license from dentists, all those who had practiced in the place of their present residence for four years was declared unconstitutional, on the ground that the exception was not made to depend on fitness, education or skill, but merely on unchanged residence.

The question as to the fitness of the dental candidates is committed wholly to the judgment of the dental examiners, and their decision is conclusive and not subject to the mandatory control of the courts, for that would be substituting the opinion of the judges for that of the Board.

The courts can only interfere in the rare instance, when the Board has found the applicant to be entitled to a license, but refuses to issue it.

A license to practice dentistry in the State of
Dental Law New York is granted after an examination to which
of New York State. are admitted those who are twenty-one years of age;
of good moral character; have completed a four
years' high school course or have received a Regents' dental certificate
and subsequent to receiving such preliminary education have graduated
from a dental school with a dental degree. No degree may be conferred
upon any one unless he satisfactorily completed a course of at least three
years in a registered dental school.

Permission is also given to the Regents to grant licenses to those who practiced dentistry in other States, provided the license is approved by the dental society of this State and the applicant has received the preliminary and professional education required of dentists in this State.

The Board of Dental Examiners in New York is appointed by the Regents from nominations submitted to them by the Dental Society. The candidates must be dentists in good standing, in practice for at least five years, and not connected in any way with a dental school either as professor, trustee or instructor. The appointment is for a term of four years.

After successfully passing the dental examination and receiving the license from the Regents, every dentist must register in the county where he resides, by filing with the County Clerk an affidavit stating his full name, age, birthplace, the number of his license and the date of its issue and that he has complied with all the requirements of the law. The fail-

ure to register precludes a dentist from recovering his fees for professional services rendered to a patient. Every dentist must also have his full name displayed in a conspicuous place in his office and every proprietor or manager of a dental establishment must display the name of each dentist employed by him. The penalty for the violation of this provision of the law, is punishable by a fine of fifty dollars for the first offense and a fine of \$100, 60 days imprisonment, or both, for every subsequent offense.

**Forfeiture
of a License.**

A dentist accused of unprofessional or immoral conduct, or of gross ignorance and inefficiency in his professional duties may be required to appear before the Board of Dental Examiners to answer the charges, a copy of which must be served on him. If found guilty he may be suspended for a limited period, or his license may be revoked entirely.

A conviction of felony, *ipse facto*, revokes the license of a dentist, and any one practising after such conviction is liable to the same punishment as an unlicensed dentist.

**Criminal and Civil
Liabilities of Dentists.**

A person who practices dentistry without license is guilty of a misdemeanor punishable by a fine of fifty dollars for a first offense and a fine of \$100, 60 days imprisonment, or both, for every subsequent offense. The same punishment is incurred by one who sells or offers to sell, or purchase a dental diploma; or materially alters it; or practices dentistry under an assumed or false name; or assumes the different titles of dental surgery, or appends the letters, B.D.S., D.D.S., M.D.S. without any right; or impersonates another at an examination, preliminary or professional.

A person who makes a false affidavit at any of the Regents' examinations, or for the purpose of registering his license in the office of the County Clerk, is guilty of perjury punishable by ten years imprisonment.

All the fines, penalties or forfeitures recovered in the prosecution of violators of the dentistry law must be paid to the Dental Society which is empowered to prefer complaints before the courts and employ counsel and officers to gather and prepare evidence.

Dentists, like other professional men, very often fail to do their work to the complete satisfaction of their patients and are sued for failure in the performance of their duties as the result.

An accurate statement of the rule applying to all professional men has been stated by a judge as follows: A person who offers his services to the community in any professional capacity as a person of skill, contracts:

1. That he possesses that reasonable degree of learning, skill and experience which is ordinarily possessed by others of the same art or science, and which is ordinarily regarded by the community and by those conversant with that employment as necessary and sufficient to qualify to engage in such business.

2. That he will use reasonable and ordinary care and diligence in the exertion of his skill and the application of his knowledge to accomplish the purpose for which he is employed. He does not undertake for extraordinary care or extraordinary diligence, any more than he does for uncommon skill.

3. In stipulating to exert his skill and apply his diligence and care, the professional man contracts to use his best judgment.

The law requires of a dentist a reasonable degree of skill and care in his professional operations, and he will not be held liable for injuries arising from his want of the highest attainments in his profession.

A dentist using chloroform as an anæsthetic agent is only bound to look to natural and probable effects.

The privilege given to physicians and surgeons
Physician and Dentist not to disclose confidential communications made to
Distinguished. them by their patients in the course of treatment
 does not extend to dentists, as they are not included
 within the term "physician and surgeon."

But the term "physician and surgeon" includes dentistry. Thus in 1898 the courts of Rhode Island decided that a licensed physician and surgeon has the right to practice dentistry on the ground that the diploma authorizes the practice of medicine and surgery in all its branches and dentistry is a branch of surgery, although by the terms of the statute "all persons who intend to practice dentistry were obliged to appear before the board and be examined."

In Connecticut, Louisiana, Mississippi, New Hampshire and North Carolina physicians are by statute, specifically exempted from the provisions of the dental law.

In New York the statute authorizes degrees of dentistry to be conferred upon physicians only after they have taken a two years' course in dentistry in a registered dental school in addition to graduating from a medical school.

The provisions exempting "practitioners of medicine" from jury duty does not include dentists, and unless they can offer some valid excuse to the judge, the dentists are bound for the present to hold the scales of justice, while pharmacists and veterinary surgeons are exempt by statute. In New York City, however, by a special provision of law, a surgeon dentist will be excused from jury duty by making an affidavit

"that he has patients requiring his daily professional attention, and that he does not follow any other calling."

The term "dentist" often comes up for construction in the matter of claiming exemption of a dentist's instruments from execution.

In most of the States, including our own, dentists' instruments, books, furniture and library (not exceeding \$250 in New York) would be held exempt, a dentist's being included in the term "professional" instruments. But where "mechanics'" tools only are exempt from execution there is a conflict of opinion, the courts in Mississippi holding that dentists are not mechanics and therefore their instruments are not exempt under the denomination "tools of a mechanic necessary for carrying on his trade," while the courts of Michigan hold that a dentist's tools are exempt as a mechanic's tools.

On the other hand, where a dentist in England sued to recover £21, the price of a set of artificial teeth, the court gave judgment for defendant on the ground that the action was for the "sale of goods," and being of the value of over £10 the agreement must be in writing to comply with the Statute of Frauds. In this country the courts allow dentists to recover, holding that the action is for "work, labor and services" and a written agreement is unnecessary.

Studies in Therapeutics.

By W. CLYDE DAVIS, M.D., D.D.S., Lincoln, Nebraska.

III.

Belladonna. Belladonna is a stimulant which directly influences the circulation; generally, when taken internally, and locally when topically applied. This is probably due to the influence over nerve function, which is true of most drugs of its class.

The preparations in most common use are the tincture and the salt atropine sulphate, the latter of which contains the concentrated active principle of the drug. Each has its special use and will be considered separately, yet the indications which call for their use are usually very obvious.

Indications. The patient is dull and stupid; if a child, it is drowsy and sleeps with its eyes partly open. The countenance is expressionless, and primarily pale, which as the symptoms progress change to one of capillary congestion

and of a dark hue owing to the non-æration of the blood. The eyes are dull or glassy and the pupils dilated and sometimes immobile. Respiration is profoundly affected. Like gelsemium it is a remedy in hyperæmia over which they each have an unavoidable and profound influence. But while gelsemium is the agent used in active (or arterial) hyperæmia, belladonna is the remedy in passive (or venous) hyperæmia, locally as well as generally, and stands true in cases of sudden occurrence as during the administration of an anæsthetic, or a surgical operation, as well as all acute and chronic cases with a clinical history.

In diseased conditions of the tissues locally, as in mucous membranes, peridental membrane, pulp tissue or any organ in passive hyperæmia, as is evidenced by a dark red color, belladonna should be considered.

All of the symptoms are brought about by, or appear simultaneously with a relaxed nerve force, hence the dilated pupil, torpid muscular action, and in extreme cases, coma, all of which are the reverse to the symptoms calling for gelsemium, of which we wrote in a previous issue of the *ITEMS OF INTEREST*.

There is no special disease in which belladonna is a "cure all," but it is the remedy in all diseases of all tissues when the above enumerated symptoms predominate, as well as in diseases of a well established clinical history, where such symptoms are anticipated.

In prescribing belladonna its influences in retarding secretions must be borne in mind, and if this is undesired, combine it with aconite when that action is not so apparent.

In general practice the tincture is frequently prescribed when the symptoms already stated are present in diphtheritis, tonsillitis, croup, typhoid fever, meningeal inflammations, erysipelas and eruptive fevers.

Atropine has the same uses as belladonna, only being much more powerful and quick in action, it has some places for exhibition.

It is employed hypodermatically in threatened cardiac, or respiratory paralysis either from pathological conditions or trauma.

It is the most persistent respiratory stimulant in the materia-medica, hence it is employed in the cases of primary shock due to trauma or surgery, and in threatened anæsthetic narcosis when the belladonna symptoms appear. In eye surgery it is of great service to the oculist in the dilation of the pupil for diagnostic examinations as well as in breaking up adhesions in a condition known as synechia.

Because of its influence over passive hyperæmia and its power to retard secretions, tincture of belladonna is of value to the dentist. In congestive neu-

**Uses in
General Practice.**

Uses in Atropine.

Uses in Dentistry.

ralgias about the face, especially of a chronic nature, either of dental or malarial origin, especially with a tendency to periodicity, the following prescription will be of service:

℞	Tinc. belladonna	gtt ×
	Ammonium Chloride	gr ×××
	Aqua q. s.	℥iv

Sig. Teaspoonful every hour until pain is relieved or dilation of pupil, if not previously dilated.

The above prescription is also good in odontalgia during the stage of passive hyperæmia in pulpitis, which is evidenced by the patient complaining of the "jumping toothache," especially following the application of either extremes in temperature, or assuming the recumbent position.

Topically belladonna is used as an ingredient in counter-irritants in the treatment of periodontitis either from gingival or apical invasion with which it is generally combined with capsicum and aconite.

The tincture of belladonna or atropine is of great value as an ingredient in devitalization paste to correct the sometimes excessive congestion of the pulp resultant upon the irritating effects of the arsenic, thus again showing its power over capillary engorgement.

By lessening the congestion, much of the pain associated with arsenious devitalization may be avoided.

The reader is requested to try the following:

℞ Arsenious acid.

Cocaine hydrochlorate pulv. a a

Moisten to the consistency of putty with the following:

Tinc. belladonna,

Creosote a a

Apply to exposure, over which place cement, temporary stopping, or amalgam in which there is a great excess of mercury to prevent hard setting and allow to remain 4 to 10 days owing to the disease present in the pulp.

In nearly every instance the death of the pulp will result painlessly, provided the application has been made without pressure and under aseptic conditions, barring non-evacuated pulp abscesses.

In acute pyalism no remedy is equal to belladonna in controlling the excessive secretion of saliva and the patient should at once be put upon rather heavy doses of the tincture of atropine.

This done results will follow the topical application of the indicated remedies.

In ulcerative stomatitis, give belladonna internally in moderate doses and paint the gums with a solution of iodine crystals in tincture

belladonna, being careful to apply it only to parts where ulceration appears, covering in each instance the congested zone as is evidenced by the deep dark red color.

Uses of Atropine in Dentistry. With such general use of anæsthetics in dentistry both local and general, no one is justified in being without the hypodermic syringe in his office for ready use. In the appearance of those symptoms where stale solutions of cocaine has been used upon persons who seem to have an idiosyncrasy of extreme susceptibility to its toxins; nothing is of more value than a hypodermic injection of the 1/120 of a grain of atropine.

Also where patient gives rise to similar symptoms during the administration of chloroform or ether. The symptoms are labored or deficient respiration with either extreme pallor or turbidity and the dilated pupil which, when light is suddenly admitted, does not attempt to contract known to surgeons and anæsthetizers as the "death pupil," which is also present at the onset of nausea during general anæsthesia.

Again when it is necessary to resort to a hypodermic of morphine to lessen the suffering of patients with odontalgia, the combining with atropine lessens the unpleasant after effects of the morphine.





Dowel Crowns.*

By HART J. GOSLEE, D.D.S., Chicago, Ill.

XI.

(Advantages; Disadvantages; Indications; Requirements; Various Designs; Separable Dowels, Inseparable Dowels, Comparative Advantages. The Davis Crown: Application, Mounting, Repairing, With Band and Cap; Accuracy of Adaptation Without Band.)

The various forms and styles of ready-made porcelain crowns which are designed to be adapted directly to the root, without the employment of a band or plate, and attached by means of a dowel, which may be either a separable or inseparable part of the crown, will, in regular sequence, in the efforts toward a somewhat systematic arrangement of the subject, be *designated* and *considered* under this classification.

While almost any of the several designs of this particular style of crown may be adapted with a band and cap, or even with a simple plate, they are thus classified because of being usually so employed, and of being originally designed to be so adapted.

Although this preceded all other styles of porcelain crowns for the anterior teeth, they are still used more or less extensively, and, irrespective of the improved means for obtaining greater *integrity* and *permanency*, they doubtless possess some intrinsic advantages, and still occupy a limited place of *usefulness* and *serviceability*.

Previous to the individual construction of porcelain-faced crowns, the application of porcelain work, and the present facilities for securing a more perfect adaptation to the root with equal opportunities for observing the

Advantages.

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esthetic requirements, as indicated in the preceding chapter, the advantages possessed by this style of crown were particularly desirable.

These constituted the ease with which the finished crown might be procured; the absence of the necessity for removing the enamel from the periphery of the root; the *facility* and *dispatch* with which they might be adapted, and the *natural* and *translucent* appearance which the splendid forms and colors of some makes afforded.

While the latter is always an eminently desirable feature, particularly in the restoration of the six anterior teeth, and gives to all porcelain crowns of any similar design a distinctive advantage over those in which the translucency is destroyed by the presence of a backing, the former should be so considered in the application of crowns designed to serve as permanent reproductions, only when such are especially indicated, and as a means of expediency.

The principal features which may be reasonably regarded as disadvantages, when such crowns are adapted without band or plate, lie in the difficulty of obtaining a crown of the same diameter as the root, and of securing a continuous and practically impervious joint between it and both the *base* and *periphery* of the root, together with the resultant absence of *preventive means* and *prophylactic* measures against the subsequent *dissolution* or *disintegration* of the cementing medium from the penetration of saliva, and the destruction of the root by caries or fracture.

As the result of a failure to observe the higher requirements in this connection, many roots have been lost from caries, or fracture, which might otherwise have possessed greater *integrity* and *usefulness*; and it is by no means uncommon to see such crowns so displaced from the stress of mastication, and the inherent weakness of the dowel, as to effect a disarrangement of the alignment, and afford a pocket between crown and root which serves as a receptacle for the accumulation of the products of decomposition.

In consequence of these possible disadvantages the application of such crowns without a band or plate, or without observing some means of securing a more *perfect* and *impervious* joint than can usually be obtained by grinding one surface to fit, and approximate with, another, is usually indicated only in those cases where *expediency* renders such choice absolutely necessary; or where, from the instability of the root, a recession of the gum tissue, or other pathological conditions, or for pecuniary reasons the application of a crown affording greater *stability in the attachment*, or *greater protection to the root*, may not seem warrantable.

And even in such instances their application should usually be con-

fined to the six anterior teeth, because of the increased difficulty ordinarily encountered in adjusting them to the more or less *irregular shapes* and *uncertain canals* of the bicuspid and molars.

Conscientiously considered, such crowns must usually be regarded as *temporary work*, in view of the reasonable and generally conceded opportunities for securing greater permanency.

Requirements.

In the application of any of the various designs now used, the same esthetic requirements as indicated in the preceding chapter prevail, and the possible permanency of the crowns will naturally increase in proportion to the degree of accuracy obtained in adapting them to a close approximation with both the base and peripheral outline of the root; and much

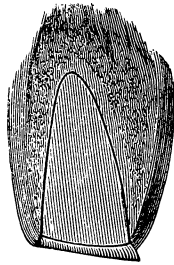


Fig. 161.

of the success attending such an adaptation will depend upon the proper root preparation.

In the preparation of the root for the reception of such crowns, the removal of enamel, or peripheral preparation of any kind, becomes entirely *unnecessary*, of course, but the shape given to the basal surface should differ from that indicated for the plate and dowel crown, because of the increased difficulty of securing an adaptation to such a shape, *by grinding*.

With the exception of the peripheral trimming, the preparation previously indicated in Fig. 50 will be found the most favorable to the requirements of the crown, and to the facility and accuracy with which the adaptation may be secured.

This consists in grinding the *labial* edge just beneath the gingival line, and in allowing the *lingual* to project slightly beyond it, with the basal surface assuming a smooth *inclined plane*. (Fig. 161.)

The former admits of the advantages considered in this connection in the preceding chapter, while the latter greatly facilitates the opportunities for securing the desired and required adaptation of the crown to the root.

Various Designs.

Although numerous designs of this style of crown have been presented from time to time, as previously recorded, only those which are now manufactured in good variety, and more or less extensively employed, will be considered. In their consideration it becomes necessary to divide them into two classes, because of the variation in their construction, and in the details incident to their respective application. Such variation mainly depends upon the possession of *separable* or *inseparable* dowels, and causes them to be classified accordingly.

The feature of this class of crowns embraces a **Separable Dowels.** separable or removable dowel, which may be previously mounted in the root, and to the projecting end of which the crown may be subsequently attached. They are designed for the purpose of facilitating the adaptation of the crown to the root, and include the principles of the Davis crown.

This class of crowns embraces the feature **Inseparable Dowels.** of an inseparable dowel, which is baked in or otherwise securely attached to, the porcelain, and forms an integral part of the crown, such as the Logan, Brewster and "Fellowship" designs.

Comparative Advantages. While both of these styles, and all of these respective makes of crowns, are much used at the present time, and either is capable of being more or less readily adjusted to the root, a close study and analysis of the comparative advantages of the two classes must result in favor of those possessing a separable or removable dowel, providing, of course, that adequate means are provided for the subsequent attachment of the crown.

This is apparent, for the reason that the opportunities for securing the closest possible adaptation, by grinding, are greatly facilitated by the temporary absence of the dowel, as its presence must necessarily afford some obstruction to this procedure, and at least increase the difficulties attending it, together with the liability of weakening the dowel, by grinding it, during the process.

The Davis Crown.

Of the several designs of crowns possessing separable dowels, the Davis crown, suggested by Dr. Chas. H. Davis, and manufactured by the Consolidated Dental Manufacturing Co., is the only one which is

now employed to any extent, or which is made in a sufficient variety of moulds and colors to meet the requirements, and it has quite an extensive application.

It is an all porcelain crown, having a slightly concaved base, in the center of which is a depressed rim, which affords a rest for the shoulder on the dowel, and a countersunk cavity extending into the crown sufficiently deep to accommodate the projecting end of the dowel.

The dowel is proportionate with the size of the crown; slightly tapered; corrugated throughout its entire length to afford increased attachment to the cementing medium; has one flattened side to prevent the possibility of rotation, and a shoulder which adapts itself to the depressed rim for its accommodation in the crown, and is made of German silver alloy for the purpose of obtaining greater inherent strength and rigidity than is possessed by platinum. (Fig. 162.)

When the proper selection has been made, the primary rough grinding may be done upon the model if the outline of the root is sufficiently

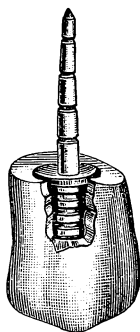


Fig. 162.



a



b

Fig. 163.

accurate, but the final adjustment to the desired adaptation should be made directly upon the root itself. This should be accomplished with carborundum stones in the engine, and when sufficiently accurate the ground surfaces, excepting the base, should be then nicely polished with disks.

The canal should now be prepared for the reception of the dowel, and the latter fitted closely to it; in some roots it may become necessary to shorten it somewhat from the apical end. When thus primarily fitted, it should be placed in position in the crown and temporarily sustained with wax until the two may be adjusted to position on the root. (Fig. 163, A.) This may necessitate a slight enlargement of the basal portion of the canal, or possibly the bending of the dowel, until the adjustment of

the crown to its proper relation with the root is obtained, after which the crown and dowel may be permanently mounted. (Fig. 163, B.)

Mounting. In mounting, all particles of wax should be thoroughly removed from the crown and dowel, and the root rendered aseptic and dry, when the attachment of the latter to both crown and root may be made simultaneously with cement, or if it is preferable to use gutta percha, the dowel should be first fixed in the crown with cement, and attachment to the root made with gutta percha.

Repairing. One of the most important advantages possessed by this style of crown is the *ease and facility* with which repair may be effected in the event of subsequent fracture.

In such instances the dowel need not usually be disturbed, as its projecting end will afford ample opportunity for the retention of a new crown, after the removal of the remaining cement, and the necessary adaptation has been secured by grinding. These crowns may also often be found applicable and useful in the repair of the Logan, and other styles of crowns, where no backing is used, and the projecting end of the dowel remains sufficiently long to afford adequate *retention and resistance*.

With Band and Cap. When it may seem *desirable* to employ the band and cap, in the adaptation of this crown, and thus add to its possible *permanency* by supplying means for the *protection* of the root, it may be accomplished with ease.

In their application in conjunction with band and cap, the root should be prepared and the band fitted in *exact accordance* with the principles previously outlined in connection with the *band and dowel crown*.

When the band has been thus fitted and trimmed to the proper width, and the root ground down to evenly approximate its edge, as indicated in Fig. 125, B, the crown should be selected and ground to a fairly close conformation with the basal surface of the root, as well as its peripheral outline.

The dowel should then be temporarily adjusted to the crown and fitted to the canal, until the crown may assume its proper relation. A plate of pure gold, 32 gauge, should now be perforated for the dowel, placed in position on the crown, and trimmed to follow its outline, with an allowance of about $1/32$ of an inch surplus around the entire circumference.

After annealing this plate, it should be again placed in position on the crown, and both adjusted to the root, with the band in place. A degree of accuracy in the adaptation of the plate to the root, crown, and edge of the band may be obtained by placing a piece of soft wood against

the end of the crown, and gently tapping it with a mallet, and then holding firmly and *burnishing the surplus edge* of the pure gold plate up tightly against the band.

When this has been accomplished, the crown should be removed, and the pure gold plate placed in its proper relation to the band, which has been made possible by the burnishing of this surplus edge, and the two then united with 20 karat solder.

When the cap has been formed by the union of the band and plate, and the surplus and excess edge finished down smooth with stones and disks, it should be adjusted to position on the crown (to which the dowel still remains temporarily attached) and securely united with wax.

The interior of the cap should now be filled with investment material, or plaster, as indicated in Fig. 127, in order to securely sustain their relation while soldering. After this has become sufficiently hard-

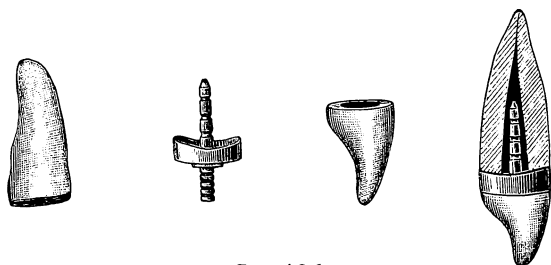


Fig. 164.

ened, the crown may be easily detached by slightly heating it over a flame until the wax melts, when the dowel should be united to the cap by filling in the space around the shoulder with 20 karat solder.

The cap may be now finished and polished, and then permanently attached to the root with cement, when the crown may be placed in position, and if too long, because of the thickness of the pure gold between it and the root, the incisal end should be ground until the length is correct and the crown then subsequently mounted, also with cement. (Fig. 164.)

While the floor may be attached to the band in the ordinary manner, without observing this detail, and the proper relation between the parts subsequently secured, this procedure is warrantable and preferable because of the accuracy and the conservation of tooth structure thus obtained, as otherwise the canal may need to be much enlarged to admit of placing the crown in its proper position and relation.

Accuracy of Adaptation Without Band. A method of securing a preservation of the root, and a degree of accuracy in the adaptation of these crowns, without a band or cap, which seems quite practical and applicable to many cases, has been suggested by Dr. J. R. Owens, of Cleveland, Ohio.

In this method the basal end of the canal is enlarged as much as is consistent with the strength of the remaining edge of the root, and then somewhat countersunk. (Fig. 165, A.)

The crown is then adjusted to its proper adaptation by grinding, and the dowel subsequently fitted until admitting of the correct adjustment of the crown, when the dowel should be mounted in the constricted portion of the canal with cement.

The surplus cement flowing into the countersunk cavity should be removed and the latter then filled with amalgam. (Fig. 165, B.) While

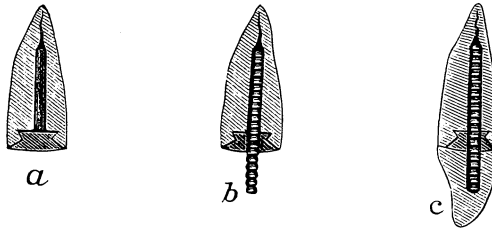


Fig. 165.

this remains plastic, the crown should be placed in position and gently forced to its proper adaptation with a piece of soft wood and small mallet. The excess amalgam is then trimmed away, until a smooth joint between crown and root remains, when the crown should be gently removed and afterward permanently attached with cement. (Fig. 165, C.)

The advantages claimed for this method are the protection afforded to the end of the root by the amalgam, and the accuracy of the adaptation between crown and root which is facilitated by its manipulation while in the plastic state. Its application, however, is necessarily confined to good, strong roots, and while the How "screw-post" is used by the advocate, as illustrated, the dowel of the Davis crown will doubtless answer as well.

(To be continued.)

SOCIETY PAPERS

Should Children's Permanent Teeth Be Filled With Gold?

By RODRIGUES OTTOLENGUI, M.D.S., New York.

Read before the New Jersey State Dental Society, at Asbury Park, July, 1902.

"Should children's permanent teeth be filled with gold?" I might say, "Yes," take my seat and make a record for the brevity of my paper. But having propounded the query, I presume that something more than a mere affirmation will be expected.

Having thus stated that I shall defend the affirmative side of this question, I must at once explain that, in advocating the use of gold I stipulate first, that the circumstances of each case, including the control of the patient, and the proper management of the cavity, must afford opportunity to insert a *perfect* gold filling.

Second, that the demand for gold is *imperative* only in *initial* cavities, the pulps being alive and in a state of unimpaired health.

Third, that the need of gold is lessened in proportion as the encroachment reaches or destroys the pulp. With these postulates I may approach the argument.

The most important part of my discussion will be aimed at the occlusal surfaces of the four sixth year molars. When I first entered upon the practice of dentistry, more than a quarter of a century ago, the sacrifice of the four sixth year molars was not considered a matter of great moment. Indeed many writers at that time even advocated their extraction, in the presence of deep caries, some going to the extreme of recommending the removal of all four teeth, if even one were condemned, and in spite of the fact that the others may have been readily saved. Even during my apprenticeship I resented and resisted this dogma. Children always received the sentence, for sentence it was, with expostulation

and fright. The extraction of four large teeth seemed to the little ones an operation of terrifying promise, the administration of gas presenting to their minds a magnification rather than a mitigation of the horrible ordeal.

Personally I have always been fond of children, and the care of their teeth has ever been the preferred part of my practice. To this fact undoubtedly must I attribute what success I have had in this field, for it is to be doubted whether the dentist who dislikes the management of children ever really performs good work for them. My feelings then, were such that it ever was my aim to yield to the wishes of the child; to lessen his dread, and to do his work with as little pain as possible; possible I mean, considering the fact that each operation must be thoroughly completed. Thus early, I set myself the task of saving rather than sacrificing the sixth year molars.

It was easy to recognize the principle that the surest road to safety must accrue from the early and proper filling of the teeth. Two points then remained to be decided; should the cavities be filled as they presented, that is to say without enlargement beyond the area of actual decay; and secondly, the choice of a filling material.

I was at that time handling a practice where amalgam was used because it was cheaper, not because the case in hand demanded it. I saw therefore many cavities in occlusal surfaces of molars, which had been filled without extension, and filled with amalgam. In the mouths of children between the ages of ten and fourteen, I constantly found it necessary to remove and replace such fillings which had been inserted but a comparatively short time previously. I concluded from these experiences that amalgam was but a temporary resort, and that if a permanent operation were to be attempted, considerable extension of the cavity must be made at the time of the first filling.

Consequently, during my very first year, and before I had received any training either from college or clinics, I adopted a theory of practice from which I have never swerved, and which I have never seen fail. The practice is based on four rigid rules.

First: The cavity must be extended to the terminals of all sulci.

Second: The filling must be made of gold, if it be possible to insert a perfect gold filling.

Third: The filling must be made of pink gutta percha, if it be not possible to insert a perfect gold filling. In rare exceptions oxyphosphate may be used.

Fourth: The filling must never be made of amalgam.

Let me impress upon your mind that at this moment I am alluding to cavities in the occlusal surfaces of sixth year molars, which reach our hands for initial fillings. Then let me add that in twenty-five years I have never broken any part of the above rule. Where possible, I have invariably placed the permanent gold fillings at the very outset. Where necessary, I have used gutta percha, and very occasionally oxyphosphate. But I have never placed an amalgam filling in such a cavity.

Moreover, I have never seen any reason for altering this practice, judging from my own work, whereas I have thousands of times seen disaster which has followed other methods, and especially the use of amalgam.

Let me pause here and present a picture which I imagine will be familiar to all. A new patient calls for the first time. Examination discloses a mouth in which are many gold fillings all in perfect order. The occlusal surfaces of all the molars; the approximal surfaces of molars and bicusps; fillings in the anterior teeth; fillings in buccal surfaces of molars above and below; all of gold; all in good order. No recurrence of decay at any point. You involuntarily say: "Madam, you have been in good hands. That is excellent dentistry." Have we not all seen such mouths, and made the commendation? Then what of the alternative picture? Has anyone seen a mouth with a similar quantity of work, occlusal, approximal and buccal cavities in the posterior teeth, all filled with amalgam, and all in perfect condition? By perfect condition, I mean a state of affairs comparable with that in the first picture, where the reliance had been exclusively upon gold. I doubt if ten men present can honestly claim ever to have seen such a state of affairs. If in the discussion, any number of men shall rise and declare that it is possible or within their experience, I shall be tempted to say to such gentlemen, "I fancy that your ideas of 'perfect condition' and mine must be at variance." For myself I will say that I have never seen a mouth in perfect condition, where amalgam had been the reliance to any considerable extent. While amalgam is a most valuable material, and undoubtedly has saved multitudes of teeth, teeth which perhaps would have been lost without the saving aid of amalgam, nevertheless I repeat that a mouth filled with amalgam is nearly always in a condition where improvement is possible if not absolutely demanded.

Returning to my early determination to endeavor to save the sixth year molars of children, by resorting to permanent gold work at the outset, let me report that I have been fortunate enough to retain in my practice a number of girls, for whom I made such fillings

**Amalgam Not
Permanent
in Young Teeth.**

**Gold a Permanent
Filling.**

during the first year of my practice; that these have grown to womanhood, have achieved motherhood, and I have filled the sixth year molars of their children in the same manner, the fillings which I inserted for the mothers being still in place, and never having required repair of any kind. I introduce this statement as a basis for two deductions. First, it teaches that permanent work may be achieved with gold at the outset. Second, that the very highest skill is not requisite to this accomplishment, since any reputable dentist should be able to do as well with gold, as I did during my apprenticeship.

Such success with half a dozen patients, properly analyzed logically proves only that, say some twenty-five or thirty fillings have been successful; it must not be supposed therefore that I relate these instances, considering them as proof of efficiency of the procedure. They are merely contributory evidence. When I add, however, that during all my experience I have seen no failures with this practice; that I have seen no recurrence of decay which was not inaugurated on some other surface, reaching the occlusal cavities because of inexcusable neglect, I think I contribute a substantial argument as to the soundness of relying upon gold in these teeth.

Please do not misinterpret my meaning. I

Personal Failures. am not here trying to establish the idea that I am a brilliant operator. I am arguing for a principle in the filling of teeth. When I say I have had no failures with this method, I mean following the proper application of the method. We all have failures, and certainly I have had my share. But where failure has followed gold fillings inserted by myself, in initial occlusal cavities of sixth year molars, it has been my personal failure and not the miscarriage of the method. Perhaps because the tooth was sensitive, the sulci were not properly followed up; perhaps because the child was difficult to manage the filling was not properly condensed, or was improperly polished; perhaps through an error of judgment the tooth was filled without the dam, the use of which may have been interdicted because the tooth had not yet fully erupted; or perhaps from physical disability, or because the cavity seemed "so easy," I personally failed to do my work correctly.

It is not supposable that for a stated number of years, working a given number of hours daily, a human being always reaches with his work the ultimate of his capabilities. Indeed the effort to do so largely is responsible for the excessive fatigue so many of us experience as vacation time approaches.

So I say, I have had failures, but they have been my failures. Wherever my rule has been rigidly carried out, absolutely permanent work has resulted. A moment's thought will demonstrate that this pre-

**Soft Teeth
No Restriction
Against Gold.**

cludes the idea of restricting the method to any given class of teeth. In this I am entirely in accord with Dr. Black. In relation to gold fillings, the so-called hardness or softness of the tooth has absolutely no bearing. There is no tooth "too soft" for gold. There is no tooth having a vital pulp, which "will not stand gold," as so many dentists have told so many patients.

As a conspicuous example of this class, and as demonstrating what may be done in a child's mouth with gold, I will relate the history of one of my patients.

About five years ago a little Miss, aged eleven, was brought to me for consultation. The child's home was in the South, but her parents visit the North each year and spend a part of September in New York. At the first examination I found a most deplorable condition. Twenty-two cavities required fillings, yet all were filled. The anterior teeth with oxyphosphate, the posterior teeth with gutta percha in the approximal and buccal surfaces, and a few amalgam fillings in the occlusal cavities. Not one of these was in good condition. Not one was saving the tooth in which it rested. The teeth were what has been designated as "soft," and horribly sensitive. I speak with accuracy when I state that the least pressure in cutting with a hand instrument would cause the child to scream aloud, shed tears and declare she would rather lose her teeth than to have them filled. A closer study of the patient showed her to be anæmic, highly nervous, impulsive, in constant expectation of suffering and altogether the most unpromising subject for thorough preparation of cavities and filling with gold. The result was that previous attendants had declared her teeth "would not stand gold," and had resorted to the readiest means of filling the teeth with the least difficulty. The environment was one of rampant caries, due to improper oral hygiene. The lack of proper cleansing of the teeth however was only in part due to improper methods, the chief cause being the suffering entailed by brushing teeth not properly protected with appropriate fillings. This was the outlook when I began. Could it have been much more discouraging?

At this time cataphoresis was the popular dental fad, and fortunately proved most efficacious in this instance. Thus I was enabled to overcome the greatest obstacle to thorough work with comparative ease. But I must say here that my work did not depend upon the success or failure of cataphoresis. Sooner than refill those teeth with temporary fillings, I would have resorted to full anæsthesia, deeming the salvation of a mouthful of living teeth, in a young girl, of sufficient importance to authorize such an expediency. The sensitiveness overcome by anæsthesia, in this case local, all the temporary fillings, I call them so, were removed and replaced with gold, the cavities being cut to the final limits

of the caries, and in the occlusal cavities the sulci being opened for the first time. Twenty-two gold fillings were placed for this child, one of such magnitude that it deserves special mention. The left upper lateral incisor was made to receive a gold filling occupying both approximal surfaces, connected by a wide area across the palatal surface, and again by a narrow crescent of gold along the labial festoon: a filling which thus encircled the tooth, yet, because of the youth of the patient the pulp was preserved alive.

The teeth being filled it at once became possible to cleanse them without causing pain, and with a little patience, the child was taught the proper brushing of her teeth; moreover, she was readily educated up to the necessity of cleansing her teeth thoroughly in order to avoid the future need of work of such magnitude.

This child has only been able to visit me once annually since the first fillings were placed, until last winter, when a school in the vicinity of New York was selected, mainly so that she might readily reach me in case of need. She is now nearly seventeen years of age. During the five years that have elapsed since the initial work was done there has been no recurrence of caries about any of the gold fillings, despite the softness of the teeth, and only five fillings in other situations have been needed. Thus the gold fillings have not only saved the teeth in which they were placed, but they have saved all the other teeth, since they made oral hygiene possible.

I fancy I hear pencils jotting down a note, to
Failures of Plastics. the effect that in this very case, which I cite to prove the value of gold in children's teeth, it was the early use of the plastics which tided over the infant and perhaps more difficult periods, until the child was old enough to appreciate and second the efforts to insert gold. I will not accept such an argument. True the plastics were used, and the time of earlier childhood passed before gold was employed, but the plastics did not save the teeth. They saved the dentist many hours of difficult work no doubt, but their constant renewal, with resulting enlargements of the cavities at each time, left the cavities many times larger when finally filled with gold, than they need to have been. Take the lateral incisor to which allusion has been made as an example. Earlier in life two small gold fillings might have been placed in the approximal surfaces, and another in the palatal groove. The other teeth filled with gold, and proper hygiene inculcated would have stopped the caries in the mouth as surely at the age of eight or nine as at the age of eleven. Thus the conspicuous festoon cavity on the labial surface might have been avoided altogether. Aside from the more slightly appearance, the tooth would have been much stronger and less liable to

fracture with three small fillings than it is now with one large gold filling encircling the tooth. Indeed it has been a source of wonder to me that a caramel has not long ago made a crown necessary.

Using the record of this case as a stepping stone from the occlusal surfaces of the sixth year molars, to the approximal and other surfaces of the anterior teeth, it is evident that my dependence in the anterior region is solely upon gold, the plastics being the resort only in the extremest cases of dire necessity, and gutta percha being preferred because of its temporary nature which will compel the early return of the patient for the permanent operation. It is very rarely necessary to resort to a second filling of gutta percha.

**Use and Dangers
of Gutta Percha.**

We may pass now to the consideration of the other surfaces of the bicuspid and molars. Providing the pulps be unaffected, gold again is the reliance and gutta percha is indicated only as a temporary expedient to tide over and so avoid any obstacle which may at the first sitting make the permanent operation impossible. I will say here parenthetically that I am speaking from the experience of the past, rather than arguing from the newer methods which I have been adopting with increasing confidence during the past winter. I have thus far mentioned gutta percha only, as the alternative for gold, but from this time forward I believe that in deep cavities where the pulp may be nearly exposed I shall more and more frequently resort to porcelain. But with this passing comment I shall have no more to say of porcelain in this paper.

Where we resort to gutta percha in deep approximal cavities in posterior teeth, especially where such cavities involve the occlusal surface, and more especially where one or both surfaces between the sixth and twelfth years molars are extensively carious I would call attention to a great danger in young mouths. The placing of gutta percha thus between the teeth has been recommended for obtaining space by separating. This force exerted by gutta percha should never be overlooked, and where any great surface of the gutta percha would be exposed to the stress of mastication, it would be a most hazardous procedure to use gutta percha at all. The wedging of teeth by this means will be much more rapid and extensive than in the adult mouth, and should the patient absent himself for a year or longer, the separation is likely to be permanent and the restoration of contact by contouring the filling almost, if not quite, impossible. I have even noted that in some instances gutta percha wedged between the molars, in driving the sixth year molar forward causes it to impinge upon the second bicuspid so as to retard its eruption, or if erupted, to actually force it down into its socket again,

thus destroying its occlusion with its opponent. This same result, the forcing of the second bicuspid down into its socket, sometimes obtains during the course of regulation, where the molar is used as an anchor and the force is applied too harshly. But in these latter cases the removal of the pressure which has been rapid, permits the return of the molar to its place, releasing the bicuspid and allowing it to rise again to meet the occlusion. This is not the usual case where the teeth are wedged with gutta percha. Here the pressure upon the molar and through it upon the bicuspid has been slow. Moreover the dentist will try to contour his filling out to restore the contact. If he does not, the space between the molars will be one evil resulting from the use of the gutta percha, while if he does restore the contact the bicuspid will be permanently held down and away from the occlusion.

In such cases there is perhaps a legitimate excuse for the use of amalgam since by its adoption a moderately permanent result may be attained. But if I were to use amalgam at all, I should prefer to fill three-quarters of the cavity with oxyphosphate and cover it only with a veneer of amalgam. Another method in these deep compound cavities is to cover the oxyphosphate with a shell of pure gold plate, about thirty gauge, which is easily moulded and burnished to place. This shell is held in place by staples or bits of wire soldered to the inner surface. The oxyphosphate, veneered with amalgam however is simpler and will answer all purposes, though it should be explained that it is but a temporary filling to serve not longer than two or three years, by which time the hope would be that secondary dentine deposited by the pulp would have made a gold filling advisable.

As this paper is already growing too long, and I have yet a few words to say in regard to amalgam, I will refer but briefly to the filling of pulpless teeth in the mouths of children. In the first place there should be no such thing as pulpless or diseased teeth in such young mouths. But things which should be, not always are, and so perforce we must occasionally meet the conditions. Usually the removal of the pulps leaves a cavity of considerable magnitude, often requiring an operation of such extent as would be too great a tax upon the endurance of many weak children. In such cases the dentist must be guided by judgment and render the best services possible in the contingency. This might be no less than an amalgam filling. Yet the aim should always be gold, with the proviso that it shall be possible to place the gold thoroughly, and without impairment of the child's health. If these conditions cannot be met, by all means use amalgam.

And now for a final discussion of amalgam, which I have in a sense

blacklisted as a filling material in the mouths of children. Let us ask of those who use amalgam, their reasons for so doing. I have asked a great number during the past few months, since promising your society this paper, and so am enabled to premise some of the arguments that may be used.

First, I am told that many patients are not able to afford gold. This I consider a most unprofessional reason for adopting any method of work. I find an inherent desire on the part of our American people to obtain the best that their purse will possibly permit. It needs only a little argument to show that a permanent and final operation which saves the tooth is cheaper at thrice the cost, than a temporary expedient which pretends to be permanent and is not. In passing this phase I must remind you that I have declared that the filling of children's teeth with gold has been my practice from the earliest days. Yet in the beginning I was associated with a man who had an enormous clientele among poor people. The fees were so low that I do not care to mention them, but as an instance I will relate that when I once charged and received ten dollars for a contour filling of great size, I was congratulated on having accomplished so marvelous a piece of financiering. So it will be idle to tell me that the poor cannot afford gold.

Yet it is this very idea which in a great measure contributes to the failures with amalgam. If a man fills a tooth with amalgam, solely because his patient cannot afford gold, he is at once in a frame of mind which operates against the performance of thorough work. If he is to receive a smaller fee than were he to fill with gold, is he apt to devote as much or even more time to the amalgam filling? I think not. It is adopted as a cheap process, and if the patient cannot afford gold, the dentist finds that he cannot afford the time for a proper amalgam filling. Let us analyze this statement. What is a proper amalgam filling? I take it that the same standards should hold with amalgam as with gold. The cavity should be prepared with the same care, and the extensions should be as great. But the man who fills with amalgam because his fee is to be smaller, or because he thinks it will be easier when handling a difficult child, is most apt to cleanse only the cavity proper, and make no extensions into the sulci. At least this has been my observation. I have seen thousands of sixth year molars studded with tiny amalgam fillings deposited at the intersection of the sulci if in the lower jaw, or at the deepest point in the upper. Of course such fillings fail. Gold would fail if similarly utilized. Again it is just as mandatory that an amalgam filling should be polished as that a gold filling should be polished. But it must be done at a separate sitting. Thus an amalgam filling should require two sittings, where the gold would require but one. But the

man who uses amalgam because his patient cannot afford gold, is not apt to give two sittings for the smaller fee. So the amalgam goes unpolished. Of all places, the approximal compound cavity is the most trying for the amalgam advocate. To do the work properly, that is to say, to follow the standards demanded with gold, three sittings are required. First, the cavity must be filled with gutta percha and the teeth wedged apart. Immediate separation will not serve because the teeth thus strained apart crowd together again as soon as the separator is removed, and would compress the amalgam while yet soft, so that nothing would have been gained by the separation. Where separation is obtained by wedging the amalgam can be overbuilt in contouring and at the third sitting the filling may be polished. If no separation is made prior to filling, then the polishing even with the finest tapes must leave a permanent space, thus destroying contact. Such a filling would scarcely be expected to serve as well as gold. Hence amalgam is no cheap procedure, and where it is so used, the result is inferior work and consequently an unscientific dependence.

It will be your right to ask if all these arguments do not maintain with amalgam when used for the adult as when used for the child. In a measure yes, and in another important sense, no.

In the first place let me remind you that, considering as I do that the best amalgam filling is less permanent than the best gold filling, I would consider that amalgam is only to be used where it can be properly placed, and gold could not, the best amalgam filling being far superior to a bad gold filling. Being less permanent, therefore, we must not overlook the fact that the younger the patient the less excuse we have for using it, for the younger the patient, the longer his probability of living and the longer the service which the filling will be expected to yield. With a patient eighty years of age it is not requisite to seek a filling that will endure for twenty-five years.

But there is another and more important argument against amalgam in the mouths of children, as commonly used. It is too often adopted because the operator desires to shirk the thorough preparation of the cavity, such preparation as he would feel compelled to give for gold. Consequently the use of amalgam in the mouths of children goes hand in hand with improper cavity preparation, slovenly polishing, and generally inferior work.

Let me remind you of the picture which I drew in the earlier part of my paper; the mouth filled with gold which causes the dentist to exclaim, "Excellent dentistry!" If that is excellent dentistry, why not practice it? And how else can you hope for such exhibitions in your

own practice unless in the mouths of your children patients you begin by filling the teeth with perfect gold fillings. There is no other way! And if you pursue such a course, other men examining the mouths of your patients will be led to exclaim, "Excellent dentistry."

The Twentieth Century Filling.

By W. T. REEVES, D.D.S., Chicago, Ill.

Read before the Colorado State Dental Association, June, 1902.

The Twentieth Century Filling must of necessity be an up-to-date filling. An up-to-date filling must have qualities to place it in advance of all other fillings and in claiming that position for porcelain I do not think I am claiming more than the facts in clinical experience have demonstrated.

Through all the years, dentists here and elsewhere have been looking for the ideal material with which to fill teeth. There have been numerous materials used, but all of them have had some great defect, or difficulty of manipulation, that caused them to fall short of being ideal filling materials. The present development of inlays, and the high state to which they have been carried, brings porcelain filling nearer to being the ideal than anything heretofore used.

An ideal filling must possess the quality of an extended range of application, durability in all classes of mouths, ease of manipulation, and harmony in results.

Extended Range of Application.

I know of no material that has so extensive a range of application as porcelain. There is hardly any condition, or class of cavity, where porcelain cannot be used and this we cannot say of any other material.

Gold has been looked upon as the most permanent of all materials and has been used for permanent operations by all first class men wherever it was applicable, but there are so many cases in which gold cannot be used where porcelain can be, that I place porcelain far ahead of all other materials.

In the mouths of the young from the age of ten and twelve on up through development to the age of sixteen and eighteen, where gold fillings would fail about as quickly as cement would dissolve out, porce-

lain fills the requirements perfectly; with porcelain you can do permanent work, whereas the cement alone is but temporary and the decay that comes around the gold is very detrimental.

Then, again, with patients of middle age, who are bordering on nervous prostration, or who are in enfeebled health, and with elderly persons to whom a protracted sitting would be an impossibility and for whom heretofore nothing but temporary work could be undertaken, permanent work can be done with porcelain, for the sittings can be divided into two or three stages for the completion of the work, none of them being of so long a duration as to tire or to make it impossible for these persons to have such an operation performed.

Another very important point, as to the applicability of any material is, whether the teeth can be prepared for receiving such material. Many a tooth might stand a gold filling and last indefinitely if the tooth could be properly shaped and prepared so that a good gold filling could be put in, but the nervous condition of the patient, or the extent of the cavity, or several other prohibitive causes make it impossible to prepare the cavity for gold.

Here is where porcelain scores one of its strongest points, because the preparation of the cavity for a porcelain inlay is accomplished with less pain to and taxation upon the patient, than the preparation of the cavity for any other material. Even so simple a preparation as is necessary to prepare a cavity for cement filling is more extensive in cutting, and consequently more painful to the patient than the preparation of the same cavity for a porcelain inlay.

Durability means but one thing and that is the length of time during which a filling will last on the average.

**Durability in all
Classes of Mouths.**

Gold has been considered the only durable material that we have used heretofore for filling teeth, but you all know how shortlived the average gold filling is, and how many cases there are where gold fillings fail about as fast as they are put in.

Now if you place any material in competition with that which has been considered the best, exclude the unfavorable cases and compare it with mouths in which fillings seem to stand forever, and find it holds its own, then it can properly be placed among the durable materials. It is to such a place that I raise porcelain, because it is the clinical experience of inlay workers that they are the most durable of any fillings, and this is true not only in favorable cases, but in mouths that are most unfavorable.

I could cite numerous cases where I have taken care of patients for a number of years and was obliged to temporize with them because

there seemed to be no material that would save their teeth. After I began putting inlays in their mouths, my trouble ceased, and today I have a number of patients whose mouths are in good condition, and the majority of them you could scrutinize closely without detecting that they had fillings in their teeth.

When a material will do this in these unfavorable, desperate cases, it certainly will do better in more simple cases; where gold fillings stand indefinitely, inlays would stand as well, if not better.

Easy manipulation does not necessarily mean **Case of Manipulation.** the quickness with which you can do the work. It more properly might mean the ease to both the patient and dentist with which the work may be accomplished.

When a dentist or anyone talks about an ideal filling material and the feature of ease of manipulation is under discussion, naturally the first thought is whether it can be inserted as easily as cement or gutta percha or amalgam. Of course gold is not considered in this respect at all because it takes long, hard work on the part of the operator to put in gold fillings. Naturally, then, when such a person looks for a filling easy of manipulation, his first thought is one that can be put in quickly.

In this feature, of course porcelain would not fill the qualification, but if one looks to the feature of the physical strain upon both himself and the patient—when he considers the permanency of the filling, then I think porcelain fillings will fill the qualification of ease of manipulation.

I will sum up what I call ease of manipulation in a porcelain inlay filling. You prepare the cavity from start to finish without putting a rubber dam on, consequently your patient is not cursing you mentally or otherwise; this is one point of ease for the patient at least, and also for yourself, because you can reach all parts of the cavity better when the mouth is not filled with rubber dam. Your preparation of the cavity is simplicity itself; of course in all cavities all decay must be removed; you do that in preparing for a porcelain inlay. When you have reached sound enamel supported by dentine, you do not need to cut back or away, as is so much advocated under the name "extension for prevention." Polish the margins well, and if the cavity shapes so as to have no undercuts, you are through with the cavity preparation. If in removing the decay you have shaped it so that there are undercuts, these must be filled with cement and then the cavity reshaped as though no such condition existed. This is simpler than any other cavity formation because you have no undercuts, no shaping in special forms to make self-locking or self-retaining walls. Next, you burnish your matrix and that is but a short operation. Then you are practically through with your patient at the chair, and, if necessary, you can dismiss him and do the work

during his absence and be ready to set the inlay at a future sitting, or the patient can read in the office and pass the time away agreeably instead of very disagreeably as it would be if you were working over him continuously.

Now what is easier for your patient and yourself than to be able to go to your laboratory to do there the greater part of the work of filling a tooth, and that is practically what you do when you make and insert porcelain inlays.

No one will claim that gold harmonizes with
Harmony in Results. the teeth, and there are a great many who object very decidedly to the display of gold, that is seen in so many mouths. Abroad there is very little gold used for fillings, because the average foreigner will not permit such a display of gold as is seen in the majority of American mouths.

A great deal of time and study has been given to cements with a view of obtaining a cement that would be durable; also in getting a range of colors by which cement fillings could be put in that would to some extent correspond to the color of the teeth, but the success attending these efforts has at best been very doubtful. We have nothing at present that meets the requirements in this line, in any degree.

Here is where porcelain scores another great point in its favor, because with the bodies that we have today, it is possible to so shade and color an inlay as to make an absolute match for the tooth in which it is to be placed, and the great majority of inlays are so good in color effect that a person might stand at close range and not detect the fillings.

This one quality added to that of durability proclaims porcelain to be the ideal twentieth century filling.

I do not think I can do better than to give you in detail my methods and procedure in making inlays and afterwards give you my reasons for such procedure.

It is almost needless to say that I am a strong
High Fusing Bodies and Platinum Matrix. advocate of high fusing bodies. By that we mean bodies that fuse above the temperature of 1840° F., or above the melting point of gold. Of necessity to use such bodies something fusing at a higher point than gold must be used to form a matrix. Platinum is the material used and platinum, 1-1000 of an inch in thickness, is the best and most desirable thickness for matrix formation.

I shall quote in part from papers which I read before the Chicago Dental Society two years ago, and before the National Meeting last year, and also from a paper read before the Iowa meeting last month.

Platinum 1-1000 of an inch in thickness is what I have always used and it has several points that make it superior to platinum 1-2000 of an inch in thickness. The very fact that it requires more work and care to burnish into the cavity will cause a more perfect matrix to be made when the work is complete; also it will have more stability and reduce the danger of warpage, while baking the porcelain, to the minimum.

**Method of Forming
the Matrix.**

The burnishing of the matrix, I divide into four divisions or steps; needless to say that the burnishing at each step is repeated until accomplished, annealing the matrix each time before it is returned to the cavity. A piece of 1-1000 inch platinum is cut large enough to extend well beyond all the margins other than the cervical margin. After annealing in the Bunsen flame, place in position so that the surplus will be about equally distributed beyond the margins of the cavity. Take a piece of wet cotton or spunk and place so as to depress the platinum into the cavity, using a minimum sized round-nosed burnisher and adding additional pellets of the wet cotton as the platinum is carried to place, care being taken that at no time are you in danger of the burnisher going through the cotton. At this point you do not attempt to turn the platinum over the margin. Remove the cotton and matrix from the cavity, and if your packing has been thorough, you will find the platinum has been carried to every part of the cavity and your margins are fairly well defined, with little or no danger of breaking through the platinum. If you have broken through the platinum inside the cavity, no harm will result as the body will bridge across without danger of flowing through. If you have any surplus at the cervical margin that will press upon or hurt the gum while burnishing, trim away at this time. Anneal and return to the cavity for the second step.

Pack partially full of wet cotton but not over the margins; then, using any method that is easiest, turn the platinum over all the margins and down upon the tooth. To accomplish this I use a piece of ordinary twilled tape, passing it up so as to engage all portions of the platinum at once, then draw it in the direction that will cause the platinum to lap over all margins, thus bringing the folds equally distributed around the surfaces of the tooth, and fairly well adapted to the surface of the tooth.

Remove from the cavity and if the platinum has lapped over the tooth far enough to bind and hold into the cavity, trim away until the matrix will remove from the cavity freely. Anneal and return to the cavity for the third step.

At this stage your work is entirely upon the margins. The platinum that lapped over on the tooth will enable you to hold the matrix into the

cavity securely enough with your fingers for you to accomplish this work. All wrinkles or folds must be burnished out and beyond the margins in both directions. It matters not if the matrix springs from one part of the cavity while burnishing upon another, although you will endeavor to hold it in place as firmly as you can; the next step will correct all faults of that nature.

I use the burnisher so that the head bears upon the margin cavity-wards and the shank upon the margin toothward; in this manner you will burnish every portion of the margins until you are satisfied with their adaptation. Also burnish the interior of your cavity so that your matrix will have as close adaptation in the tooth as at the margins.

It may be necessary for you to anneal several times before you complete this stage of the work, but do not leave this stage until it is thoroughly completed.

Now you come to the last and final burnishing. If there is any feature in burnishing the matrix that I might claim as original, I think it is this, for I do not know of its being used by anyone previous to my showing it. That is a method by which the matrix is held firmly to every part of the cavity and at the same time will not interfere with the burnishing of every part of the matrix. For that purpose I use a strip of rubber dam which is drawn tightly and binds the matrix into the cavity in all directions. You can now go over all the margins and surfaces and burnish out all the spring there may be in any part of the matrix. It is not necessary to spend as much time in burnishing at this stage as you did at the previous stage. You had practically secured your close fit before reaching this last stage, consequently about one-third of the time will be sufficient to give you close adaptation of all parts of the cavity and walls of the tooth.

Now comes the removal of the matrix from the cavity without warping it. By patient and careful teasing you can accomplish this; if you are afraid that you have sprung it ever so slightly, dry out the cavity and dry the matrix; place it in the cavity and use the rubber dam again; this time it will tease out easily. The capillary attraction of the saliva between the matrix and the tooth will often hold it very tightly. Grasp the edge of the platinum at some point as far removed from the margin as possible, and where there is no fold to make it rigid, with a pair of laboratory pliers that you can lock; burn off the saliva in the Bunsen flame to avoid any possibility of gassing. The matrix can now be handled freely in building in the porcelain, for the bending of the platinum will take place at the pliers and not near the margins. At this stage, if desirable, the patient can be dismissed, as there is no necessity of reburnishing any part of the matrix after having done a baking.

**Management of
High Fusing Body.**

For illustration of handling the body, I will describe the making of an inlay for an approximal cavity in a central incisor extending from the cervical or gum margin to and including a third or half of the cutting edge.

Select some one of the several good bodies that are on the market to build what I call the foundation of the inlay; I use Close body or Brewster's Foundation. Have it finely ground for it will pack more solidly, carve better and shrink less than coarser. Build it into the matrix little by little, jarring it down well to make it solid; build out the corner in excess of what you expect the contour to be, to allow for shrinkage; when sufficiently dry so that you can carve it, begin to carve and shape it up—so that you will complete this work before it is dry enough to crumble. Carve the lingual surface right down to the contour which the matrix gives you, then carve away what would be the labial half of the inlay; carve it away right up to the matrix so that the room for laying on your colors will be the same at the edge of the tooth as any other part of the inlay. Bake this and if you have estimated your shrinkage correctly you have practically an inlay for the lingual half of the cavity; if shrinkage has been more than expected, build on more of the foundation and bake again.

Color.

You are now ready to build on the colors required, and you can vary the shading from neck of tooth to cutting edge at pleasure. I never mix two or more bodies together to vary the shade of one, but depend on the thickness of the layer to give me the shade I want. You can get any shade of a given color by the thickness of the layer you use. I can best illustrate this by showing the effect of holding a sheet of colored glass to the light; you get a certain shade of that color; place another sheet back of it and you get a deeper shade of the same color and by adding more sheets of glass you get a still deeper shade of the same color. It is the same in using bodies; you can get any shade of a color by the thickness of the layer you use. Build your colors on in layers and bake each layer as you go along. When you have built your colors to almost full contour cover the whole inlay with a neutral color that will allow the underlying colors to reflect through; in this way you will get a translucent effect, and it is the only way that the translucency so desirable can be obtained. In the tooth you are trying to match, the colors are all in the dentine and reflect through the enamel; the enamel of all teeth is practically the same color—the different shades of teeth depend upon the difference in the dentine.

All inlays, whether restoring contours or simple saucer-shaped cavities, I build up in layers and never less than three layers—foundation, color and enamel.

Before stripping the platinum from the inlay, try into the cavity to see if you have the correct contour, also to judge of the occlusion as near as you can by observation. You should not have the patient close upon the inlay because previous to its being set it would be easy to fracture the porcelain. After the cement is completely crystallized, a thin porcelain filling in the occlusal surfaces of molars will have the full strength of the whole tooth to resist masticating stress and is in no danger of fracture.

If your contour is lacking, build on more; if too full, grind and change as desired and return to the furnace to be glazed again. The inlay is now ready to be set. I will leave the setting of an inlay to be shown at the clinic for I fear I shall weary you with details before I get through.

I will now give my reasons for what may seem to be a tedious process compared with the time the majority of inlay workers spend in baking an inlay. Also a new principle in color selecting and the way to manipulate to get the effect, and close with some reasons why porcelain is the most permanent of all the materials we use today.

Building an inlay in layers accomplishes three **Why Build in Layers?** objects: First, a natural looking, translucent inlay; second, an inlay built of three or more layers of different body will break up the absorption of light so that from whatever angle or point of view you look at it, it will appear practically the same, while an inlay built all of one body or mixture will absorb light all in one direction; viewed from one point it may seem all right, but from the opposite point of view will show up as plain as black and white. An inlay built in layers will come very near imitating Nature's method of building up a tooth and by breaking up the direct absorption and refraction of light rays, will come very nearly looking the same from all points of view; third, you overcome that great bugbear of most inlay workers—the cement showing through after the inlay is set. An inlay built up in layers will prevent the reflection through from underneath of the cement it is set in; you will often hear operators say they had a splendid color before the inlay was set, but after it was set the cement killed it entirely. That was because the inlay was all baked of one body and the cement could reflect through from underneath.

The three points I claim for this method are translucency, avoidance of shadow, and prevention of cement reflection from underneath.

Here I want to bring before you a new principle in color selecting. I quote in part from a paper I read before the Iowa State meeting last month:

"It is the general practice to select the color as one selects a facing for a crown—by taking the shade guide furnished with every outfit of bodies and selecting the color that seems to be a match for the tooth. In selecting a facing general effect is aimed at and the selection is one that harmonizes with the adjoining teeth. A person might select a facing, that placed between two natural teeth could not be detected, but if a corner of that facing was joined to the corner of either adjoining tooth it would not match at all; why? Because each tooth has different underlying colors. It is underlying colors you want to look for. It will surprise you when you look at a tooth in this way what a different lot of colors you will see, and it is just in proportion as you are able to see these underlying colors and are then able to reproduce them in your inlay, that you will be successful. It will surprise you when you look in this way at what you would say was a typical light yellow tooth, to see that there is either a gray or blue tinge or both down inside that tooth. You want those same colors in your inlay or it will not be a perfect match. Now I use the shade guide not to get a match for the tooth, but to help me in looking for the underlying colors and the degree of those colors."

If you see yellow, brown, blue, gray or all of them, hold the shade guide to the tooth and determine the strength of these colors, also the order in which you will use them to give you the effect you want. Make a memorandum of this. For instance, you have a typical light yellow tooth you are making an inlay for; the cavity extends from neck to cutting edge, involving at the cutting edge a third (more or less) of the width of the tooth. Yellow No. 2 on the Brewster shade guide looks to be a perfect match for the tooth, but at the neck you will find the yellow a little deeper, with a grayish tinge through the center third of the tooth and a bluish tinge towards the cutting edge; now you will find on looking closer that the blue seems to reflect through a gray and that there is very little yellow in this part of the tooth. My memorandum would read thus: Patient A; Foundation—Cervical No. 3 yellow; Center—No. 6 gray; Cutting edge—No. 9 blue under No. 5 gray; over all No. 2 yellow with No. 11 for enamel.

I would proceed to use them as follows: Build my foundation as described; the yellow, gray and blue would then be put in their respective places and baked as one layer; have the three bodies properly moistened and arranged on the slab so that you know which is which; take as near as you can judge the proper amount of each and place at their

respective places; then a slight draw of a knurled handled spatula will draw the moisture to the surface and cause them to run together; cease instantly and you will have a perfect blending from one color to the other; if you continued to jar you would get a mixture instead of blending; allow it to dry and bake.

You will find shrinkage will necessitate the building on of more of these colors and this time as you want gray over the blue you will only use No. 3 yellow and No. 5 gray; have the bodies ready and proceed as before; this will still further harmonize your colors because the yellow will extend still further down your inlay and modify the gray that was put on in the central portion, while the blue of the lower third modifies the gray so that when they are all covered with the lighter yellow you have such a harmonizing of colors that you cannot tell it from nature's work itself.

If shrinkage causes any lack of contour, and it nearly always does and is really to be desired, cover all with a layer of Brewster's XX body; this is a new product that Mr. Brewster has been working at for some time, and he brought me the first to test about two weeks ago. You cannot say it is any particular color unless you call it enamel color; so far it seems to fill its mission perfectly. You now have a completed inlay that I believe comes the nearest to reproducing nature of any means or methods heretofore attempted. A still further artistic effect can be obtained by the use of what I call primary colors. They are as deep as ivory black, Prussian blue, Van Dyke brown, burnt ocher, etc.; they are high fusing bodies and not paints, but they must be used as paints would be, by putting them on mixed with oil, for you cannot put them on thin enough or smooth enough mixed with water as you do ordinary bodies.

These are a set of colors that were made for me by Mr. Brewster of Chicago and are meeting a long felt want. Their use is not confined to inlays but they can be used to artistically change facing and teeth for all kinds of artificial dentures. Mr. Brewster has now put them on the market in a very convenient form. They are a distinct, separate set from his regular set of bodies. With them you can reproduce that steel blue line you so often see just above the cutting edge, also the tobacco stained teeth and the white and yellow mottled teeth. These effects have heretofore been impossible, but with the primary colors they can be reproduced with lifelike naturalness.

**Permanency of
Porcelain.**

Why is porcelain the most permanent of all the materials we use today? There are several clinical facts in connection with inlays that are at present unaccounted for: First, practically there is never a recurrence of decay around a porcelain inlay. Second, they stay in

all cavities, under all conditions, better than gold fillings. Third, when in contact with an adjoining tooth they are a protection and safeguard against decay of said tooth.

To the first I will not try to give an answer, only to say it is an established fact, through the observation of all inlay workers that there is seldom or never any recurrence of decay around an inlay. This fact of itself is enough to place porcelain among the first as to permanency.

Second—here is where we have so many doubting Thomases; it seems almost impossible for a dentist to conceive of any other law of physics other than the law he has been brought up on, that of self-retentive form of cavity, and interlocking form of filling material—and almost equally hard for the majority of inlay workers to get away from the same law.

In the April issue of one of our leading dental journals was printed a paper that was read before two dental societies in which the author gave his conception of a cavity formation that would be interlocked against lateral stress. There are others that are working along these same lines. This is a useless waste of time on the part of the operator and a needless infliction of pain upon the patient. Still others are baking into inlays platinum pins and loops for the purpose of retention.

It has been a number of years since I abandoned this practice. This came about through having a tooth so sensitive that it was impossible for me to cut the pit for the pin to set in. It was a case in which an inlay was indicated and I made one without a pin in the cutting edge, trusting to luck that it would stay; it stayed just as well as any that had pins baked in. This set me to thinking and the result was that I abandoned all such means of retention. It took me longer to get away from the idea that I must undercut the cavity before setting the inlay and undercut the inlay as far as possible. It is about three years since I abandoned this practice, and I believe that clinical experience has taught me the true principle of inlay retention—close adaptation in all parts of the cavity and the cement setting under pressure.

“It is exactly on the same principle as a joiner joins two pieces of wood; he prepares the surfaces to be joined so that they are in perfect adaptation to each other and placing glue on these surfaces, places them in a vise or clamps them together under as much pressure as he can until practically all the glue is squeezed out and leaves it to harden, and the less glue there is, the stronger the joint. This I believe is the true principle upon which inlays depend for their strength of retention. It was formerly my practice to score the reverse side of the inlay with a knife edge carborundum wheel removing as much of the glaze as possible, but often inlays were of such size and shape as to make this extremely diffi-

cult. It has become my practice for some time to etch the reverse side of all inlays with hydrofluoric acid; this removes all the glaze, leaving a roughened surface, but does not alter the close adaptation the inlay must have for the interior of the cavity as well as at the margins."

Third, when in contact with an adjoining tooth they are a protection and safeguard against decay of said tooth. I have always contended that an inlay should never be ground on any surface other than the occlusal surface after it is set; if any grinding is necessary it should be done before the matrix is removed and glazed again in the furnace.

The approximal surface of a gold filling or crown, no matter how highly polished, will retain fine particles of food settlement that are an exciting cause of decay. The natural enamel is easily attacked by the acids of fermentation and soon becomes roughened and holds increasing quantities of debris and decay follows. Glazed porcelain will not retain food deposit and is not affected by the acids of the mouth. Therefore in the approximal space where one tooth surface is restored with a porcelain inlay, there is less liability of decay of the adjoining surface, while if the restoration had been by gold filling the liability would have been increased over the original conditions, because gold soon becomes tarnished and retains collections even more readily than enamel. These I believe are sufficient reasons to establish the claim that porcelain is the most permanent of any filling material we have to restore lost tooth structure.

If there are any present who are not convinced that porcelain is an up-to-date, twentieth century filling material and comes very near completely meeting all the qualifications of the ideal material, I hope you will seek me out that I may give you some more facts and reasons and make a convert of you; if not to my methods at least a convert to porcelain, the coming material in dentistry.

Treatment of Children's Teeth.

By THEODORE ASHLEY, D.D.S., Canon City, Colo.

Read before the Colorado State Dental Association, June, 1902.

Authorities on the treatment of children's teeth advise the cleansing of these teeth as soon as they have erupted, and great pains have been taken to educate parents in the importance of early habits of oral cleanliness. If we go farther, there is still another period overlooked by both the dentist and the general practitioner—that is, from the birth of the infant until the eruption of the teeth. At this period strict rules are laid

down by attending physician regarding sanitary surroundings of both mother and child; but as regards the baby's mouth, very little is done. My attention was first called to this, three years ago, on seeing a mother swab the mouth of her first-born with a cloth and water. She said: "If milk were allowed to remain in the mouth it would soon curdle, become an irritant and cause a sore mouth." This I had neither heard of nor read in any of our dental literature. I thought I had something new. If this has been observed by the laity, we as dentists can readily understand that this is a good practice, not only as a prophylactic measure in preventing stomatitis, but also as a preventive of other diseases common to infants.

During this period the saliva is very inactive; hence the mouth is not as self cleansing as later on. Infection in the mouth from milk undergoing putrefaction and fermentation will certainly be the consequence, as we have here a good culture medium. These germs may be carried into the stomach, producing fermentative dyspepsia and gastric irritation or other diseases, and perhaps in a measure this may be responsible for that everlasting disease called colic.

In the story of dental evolution we find that anything which interferes with the process of nutrition preventing assimilation and appropriation of the proper nourishment to these organs will be recorded in faulty structure. So then anything which aids in building up general good health at this period of life will also be conducive to sound tooth structure and normal dentition.

Dr. Edward Kirk in the *Cosmos* for May, 1901, explains scientifically this theory of the care of the infant's mouth, in its relation to tooth development, in which he recommends the use of a weak solution of phenol sodique or boric acid.

During the period of dentition the care of the child is left largely to the family physician. We as dentists are seldom called upon, except in serious cases when everything else has failed to give relief.

The place of dentition as an etiological factor in the diseases of children has given rise to much discussion among writers of dental surgery and writers of diseases of children. From an early period the view has descended that a majority of the diseases occurring between the ages of six months and two years were due to difficult dentition. The list of such diseases is a long one. Fever, vomiting, diarrhea, bronchitis and other catarrhal conditions, eruptions of the skin, conjunctivitis, earache or reflex nervous phenomena, like strabismus, convulsions or meningitis. Again some of the most recent and highest authorities on diseases of children declare these troubles can all be traced to causes other than

dentition, and that gum lancing is an entirely useless procedure, used more by the ignorant practitioner unable to diagnosticate obscure diseases, than by the intelligent man who is able to discover the true pathological state. The symptoms which usually accompany dentition are fretfulness, loss of sleep, with more or less gastric disturbances and perhaps some swelling of the gums. This symptom of loss of sleep is not confined to the child, but extends to all other members of the family, a fact to which those of you who have children in your homes and have taken turns at night-walking can testify. These symptoms just mentioned are to be regarded merely as the natural accompaniment of dentition and indicate nothing very serious or of an abnormal character. If the family physician is called in he will inquire after the baby's bowels and administer the proper drugs, such as bismuth, gray powder calomel, good, old-fashioned castor oil or a drug containing opium in some form, assuring the parents that dentition is a purely physiological process and that the child is only a little nervous from some stomach trouble. In a short time a tooth is erupted and all is well.

Again, there are cases of a more serious character. Of these I have only seen a few, where I have been in consultation with the attending physician.

Gum Lancing. These patients were of rather impaired health and low vitality, with no local manifestations of swelling or congestion of the gums, simply a tumor or prominence over the teeth next to be erupted. The constitutional symptoms were nervousness, sleeplessness, indigestion with diarrhea. Everything known to medical treatment and change of diet had failed to give relief. I suggested lancing of the gums, following the rule of Dr. James W. White. He says: "Local indications demand the lancet; constitutional symptoms of distress not otherwise accounted for suggest and justify it." After twenty-four hours the symptoms of distress had nearly ceased, the teeth were rather deepseated, and the gums were tough, something like cartilage. These same symptoms would return with each group of teeth as they were erupted, and with each repetition of the operation there was relief. Thus I cannot help but believe the cause was from the teeth and that the lancet still has a place as a therapeutic measure. This operation should be performed as thoroughly and quickly as possible. This is very awkward to do with the ordinary gum lancet. (I am speaking now of the crucial incision over the molars and cuspids.) The instrument should be double-ended and the blades bent to such an angle that we can operate on the same side of the mouth by simply turning the ends and on both right and left sides, without removing the fingers from the mouth. The blades should be made pointed to insure cutting of all the fibers over the fissures.

The assistant should sit on an ordinary chair, holding the patient in his lap, the hands being held, with the head resting on the bosom of same. The position of the operator in my mind should not be on a chair opposite, but more conveniently with one knee on the floor. In this position he can get closer to the patient, which makes it easier to control the child's head and jaws with one hand, while operating with the other, inserting two fingers, one holding the cheek, the other the tongue away, and the thumb being firmly held under the chin.

I hope I have not impressed upon you that this operation of gum lancing is a hobby of mine and that it should be performed every time a child is sick. I only mean that it is the correct treatment where indications justify it.

**Care of
Deciduous Teeth.**

In regard to the treatment of the deciduous teeth, I will not take up time in discussing the importance of retaining these teeth. This has been discussed so much in our society, I think I am safe in saying that we all agree that these teeth should be treated and filled until the proper time for them to be shed.

Children should be early trained to the use of the tooth brush, which would be an easy matter if we only could get the parents interested and if they would brush their own teeth. Children are easily taught to do the same, as it is natural for them to imitate everything their parents do. If only food is kept off in the earlier stages, that is about all we can expect until they grow a little older. At the first sitting if the child is afraid, I do not try to do any filling; I simply treat the cavities with nitrate of silver, which will stop decay and also relieve the sensitiveness until the next sitting, when these cavities may be excavated and filled. (The application of silver nitrate is made easy by a saturated solution mixed with asbestos fiber, which is carried into the cavity and sealed up with cotton.)

Filling materials should be non-irritating, non-conducting and easy of manipulation. Many are recommended by different operators, such as copper amalgam, oxyphosphate of zinc and copper, gutta percha, a mixture of cement and amalgam, tin, etc. I use copper amalgam and nitrate of silver more than anything else. Copper amalgam is easy to manipulate; it does not need the retention as other materials do. It is non-irritating and does not shrink. It is a good preventative of decay and can be used in close proximity to the pulps without irritation, and with this material it is not necessary to have the cavities absolutely dry, as with other materials. Gutta percha is recommended as an ideal filling material, but with me, I have had poor success; probably this is the fault of the operator and not the filling material. To insert a gutta percha filling, the cavity

must be kept dry. This is difficult with children. The material and instruments must be heated, which usually frightens children. In preparing cavities in children's teeth, as in the permanent, we are glad to prepare them in any way we can to retain the filling, using the engine as little as possible.

In cases where the pulp has to be devitalized I use creosote and arsenic. This I do not consider dangerous in the least, if the application is made carefully and the smallest quantity possible is carried into the cavity and sealed up. Abscessed teeth I treat about the same as in permanent teeth. At the final washing out the canals and after sterilizing, I fill them with paraffin, which is easier and quicker than anything else, simply placing a small piece into the pulp chamber, then using an Evens root canal dryer, which needs to be only warmed, as the paraffin melts at a very low temperature and follows the plugger to the end of the root. It probably does not matter much whether the canals are filled or not, but it seems to me if they are left open there must certainly be a place where organic matter may lodge and decompose.

These are merely the methods in which I have the best success. There are many other ways of which I hope we may learn in the discussion.





New Jersey State Dental Society.

Thirty-Second Annual Meeting, Asbury Park, N. J., July 16, 17 and 18, 1902.

Morning Session, July 16, 1902.

The president, Dr. Fish, introduced Rodrigues Ottolengui, M.D.S., of New York City, who read a paper, entitled "Should Children's Permanent Teeth be Filled With Gold."

Discussion of Dr. Ottolengui's Paper.

**Dr. M. E. Rhein,
New York.**

This paper, in its principles, is rather a radical departure from the methods pursued by a great many; at the same time the arguments presented by the essayist, as to the reasons why gold is not used as a filling material by the large majority of operators, is one that it will be difficult to controvert. The essayist has struck the keynote of the cause of operative failure in a large number of young teeth that are filled,—the desire of the operator to either save himself by the manner in which the operation is performed, or to pursue what is frequently called a diplomatic form of practice, having regard to what the patient would like to pay for the operation, irrespective of the saving of the tooth. That portion of the essayist's paper is unquestionably worthy of the highest commendation and approval. The habit, which has been a growing one with a great many operators, of not doing the best for every tooth that comes before them for treatment, is, in my opinion, a crying shame and a blot on American dentistry today. It is unpleasant to make a remark of this kind, and yet it is one that bears the stamp of truth, and which cannot be denied by those who have carefully observed the conditions of teeth that have come under their care.

It seems to me that the point of merit in the paper lies particularly in the direction of the immediate need for American dentists to awaken to the fact that any operation upon teeth, and more so upon young teeth than upon any others, that needs be done should be done thoroughly and

honestly, or the patient not attended to at all. It is my own opinion that a tooth which is improperly filled, that is, which is filled imperfectly, causes much harm, and that the tooth itself would be in a better condition if allowed to remain untouched by the operator than if an imperfect filling be placed therein. That is a very radical statement, perhaps more so than some of the statements of the essayist, for I have often heard the argument advanced, "Well, the patient cannot afford the very best kind of work, and it is better, far better, to have inferior work than no work at all." I have never, in my experience, and in the careful observation of the dental organs, been able to approve of that sort of argument. I think the argument rests on very false premises. It has been a matter of observation, and one that has been lately brought out by some of our most able men, that the periods of life in which caries makes its ravages in the human teeth vary, and that they cease after an interval, perhaps to start again at a later period, and I believe firmly from my own observation, that in many cases if the teeth were left alone during these periods they would eventually be in a better condition than if they were maltreated, in the manner that is often seen, by operators who feel that it is necessary to do two hours work in a period of fifteen minutes, in order to satisfy the ideas of the patient, as far as possible, from a financial standpoint.

In regard to the principles brought out by the essayist, I agree with him to a certain extent. I believe that a large number of the permanent teeth may just as well be filled with gold at the initial operation as with any other material, if the operation is thoroughly done. But I do not believe that the essayist is so absolutely radical in his practice, from my knowledge of him. I think that there are exceptions to every rule; there are certain conditions—conditions of the patients themselves—that would not be in accord with the following out of such a practice.

To my mind the lesson to be learned from this admirable paper is the necessity of a thorough operation, and I am fully in accord with that point, and can heartily endorse it.

For my own part I believe that an amalgam filling may be properly placed in position at that period in life; if the operator will carefully remove all the dangerous portions of the occlusive surface of a molar so that the amalgam will entirely cover all that portion of the tooth that is absolutely affected by caries, there is no reason why such an operation should not preserve that tooth just as well as gold, if the amalgam is properly introduced. But I agree also with the essayist that it is, at any rate, as much of a time-consuming operation to insert an amalgam filling as it would be to insert a gold filling, in such a position, and insert it properly. I do not see how that argument can be controverted. On the

other hand, it is oftentimes preferable to insert an amalgam filling and consume more time in the operation, with children of that age, if there are conditions that would make the insertion of gold one that would be objectionable from the point of causing more pain, and affecting the child more from a nervous point of view than would an amalgam filling, at that particular time. I merely make that distinction in order to bring out the point that there may be conditions in which an amalgam filling would be preferable, even though more time were taken to bring about an operation that would be satisfactory to the eye. (Applause.)

This subject of filling children's teeth has been
Prof. James Cruman, thrashed over for the last thirty or forty years, and
Philadelphia. I do not know that we will ever arrive at any posi-

tive or definite conclusion in regard to it, but in an experience of some fifty years I may say that I have rarely, if ever, listened to a more radical essay, or one more contrary to my own experience than that which has just been read. It paralleled the dictum of my personal friend, Dr. Black, which the essayist also repeats, that there is no difference between teeth; that soft teeth and hard teeth, so-called, are exactly the same. I do not believe that; I never saw anything yet to convince me of the truth of it, and the essayist assumes that he can pack gold into children's teeth irrespective of those conditions. If he has accomplished that he has done something more than I have ever been able to, and perhaps it is my own fault that I have not been able to do so. The essayist also assumes that all teeth can bear gold filling; he does not take into consideration for a moment the character of every tooth, and especially of the so-called soft teeth, nor the fact that every tooth in the mouth is perforated by a fibre that will carry to the pulp, to the central organ, through the agency of thermal action, irritation which may be produced by the action of gold. (Applause.) There is not a word, Mr. President, with regard to that fact, and it is an important fact. You probably all know, for I am talking to intelligent men and women who have graduated in recent years, that certain features of every tooth require constant attention through thermal action on that tooth, and you cannot fill indiscriminately without some attention to this point. I recall instances where gold has been placed in occlusal cavities, and the gold lasted and the tooth lasted and gave no trouble to the individual, but in the majority of cases the thermal action—the action of heat on gold, gold being one of the best conductors of heat—has carried the irritation through the fibres to the pulp. In such cases, in a very short time irritation becomes so great that the pulp dies. (Applause.) I could bring up instance after instance of this fact.

I remember very well, thirty years ago or more, I had a young

patient with teeth of the character that the essayist has mentioned—soft teeth; the parents objected to my treatment, but I convinced them it was the best thing to do, and filled the teeth with gutta percha; the child was twelve or fourteen years old. I had occasion to leave the country for a considerable time, and while I was away she fell into the hands of an individual like the essayist, who placed gold in every one of those teeth, and in each of them the pulp died. (Applause.) Now, all take heed!

I think, Mr. President, that the doctrines that have been brought forward this morning are very injurious; it is just as I have said of Dr. Black's idea, that they were injurious to our profession. We need more conservatism. (Applause.) I am not naturally conservative; I am usually radical; I like to do things, but I cannot, in view of the possibilities connected with tooth structure, for a moment believe that you can fill every tooth, no matter how well done—I care nothing for that—with gold. It is that principle as suggested of which I am complaining this morning, and I do complain against the essayist, for I believe he knows better! (Laughter and applause.)

While the essayist was reading his paper I made a little memorandum that "this is thrashing old straw." Prof. Truman has anticipated that remark. This matter was gone over by Dr. Dwinelle and his colleagues as long as thirty, forty, and even fifty years ago, it is ancient history; there is nothing new in it. Nevertheless the paper sounds well. Dr. Ottolengui is a master of the English language, the words come from his tongue trippingly; like the water dropping from the eaves it is musical, and to those who do not stop to analyze his essay, or recall their own experience, may be convincing by its dogmatism. I am very glad that Prof. Truman made his comments. They are a sufficient argument and answer to some of the statements that Dr. Ottolengui has made.

I cannot help calling to mind that Dr. Ottolengui's memory is very poor. (Laughter.) I know of a *patient*, ten or twelve years of age, or under, for whom he put into sixth year molars the very amalgam which he now decries and which he says he forgets he ever did. (Laughter.) But it is very convenient to have a forgetting faculty when one has a certain point to make. It may be the case with all of us; if we want to make a certain point we forget that which we may have done that will militate against us.

Dr. Ottolengui is not only, as I said before, a master of the English language, but he has written several novels. His essay sounds to me like a novel, in which we know very well an author does not pretend to

stick to facts. (Loud laughter.) He is working from his inner consciousness out of his imagination. The last novel the essayist wrote was called "The Crime of the Century." In listening to his paper I was reminded that when I read that book I did not know just what that crime was. I have found out now. (Loud laughter.) The novel written by the essayist before the one I have just mentioned was entitled "Final Proof." We have today, ladies and gentlemen, the "Final Proof."

Dr. John T. Hart,
New York.

The essayist made an excellent argument on both sides of the question, and yet, after all has been said, I fail to see why his argument in favor of an amalgam filling, in the case of a youthful patient, is not his strongest.

The individual must be considered as well as our ideal in dentistry. While most assuredly we all should aim at a high standard in our operations, yet we do not wish to place our patient in such a mental attitude that he will not feel inclined to make frequent visits for dental service, and the simpler our operations are, so that the physical strain on the patient is reduced to a minimum, the more willing will that patient be to return for further work, and consequently temporary fillings are more serviceable to the individual until the root of the tooth is fully formed and until the patient is in a condition enabling us to make a more practical application.

The essayist says himself that in some cases he would suggest the use of a maximum proportion of oxy-phosphate, with a minimum veneer of amalgam; and then he produced the argument that where amalgam was used it necessitated a second and sometimes a third visit. I do not see how he gets away from that second visit, even where he uses a minimum of amalgam, and if the patient is to return for the finishing of the filling I do not see any disadvantage in placing an amalgam filling if it is well done. I think the whole argument reduces itself to the proper placing of the filling. Unfortunately the simplicity with which amalgam filling can be put in has made some operators careless, but the same argument might be used against any filling material which is improperly employed, and I think the consensus of opinion of those assembled here to-day would be that an amalgam filling properly placed will save as many teeth—yes, and more teeth—in the mouths of young people, than any filling now in use. (Applause.)

Dr. R. M. Sanger,
East Orange.

I thought with Prof. Truman and Dr. Kingsley, as I listened to this paper, that it was going over old ground; but then there was another thought, and that was that what is old to us is new to many of those within the sound of my voice.

The subject chosen by the essayist is one which presents many sides, and the viewpoint of the listener determines the impression he receives from the essay. Dr. Ottolengui has sounded a warning that is not untimely, for it is never an untimely warning to preach against slovenliness in the practice of dentistry. Amalgam is one of those tempters which leads a young man into grievous faults. The great difficulty with it is that it can be manipulated easily and for a time may look well, and appear to be good dentistry. That fault has opened the door for long and serious discussion, *pro* and *con*, as to whether it should be used at all or not, and undoubtedly it is selected by many dentists, because of its ease of manipulation, thus leaving them to do what you would call cheap and careless dentistry. Yet I do not believe that an amalgam filling skillfully done with proper preparation, care and attention, needs to take a back seat to any filling material which the dentist has at his command. (Applause.) At the same time I do believe that it is possible to so manipulate gold that it will be an abomination in the mouth. In other words, gentlemen, bad work with any material is an abomination, and there is no material at the command of the dentist for the saving of teeth that may not be badly manipulated. The material used for filling has no bearing whatever, in my opinion, upon the preparation of the cavity to receive that material. Dr. Ottolengui spoke at length of the difference between the preparation of the cavity for the amalgam and the preparation of the cavity for gold in the cases cited, but it does not follow that because he has cited two phases of preparation and assigned one to amalgam and the other to gold, that we must follow such a course, and I am sure that most of you will agree with me that if proper care is taken in the use of either of the materials mentioned the result will be highly satisfactory.

I have very great respect and admiration for the
Dr. C. S. Stockton, author of this paper. Dr. Kingsley somewhat anticipated what I would say, and that is that I judge
Newark. that the essayist in writing this paper was simply sending out another detective, as he does in his novels, to find out from us who are listening and who might speak upon the subject just what the result would be. I have not any idea, as Prof. Truman very wisely said, that Dr. Ottolengui believes for one moment everything that he says in that paper.

Dr. Ottolengui. Yes, I do!

So much the worse for you then. (Laughter.)

Dr. Stockton. I say it is practically impossible to properly prepare all children's teeth for gold filling. (Applause.)

Dr. Truman brought out the fact that these teeth which the essayist has

talked about are permeated like a lattice work; the spaces are very large, and the protoplasm filling them communicate with the pulp and render the teeth very sensitive. Such children have not yet reached the age when they know the necessity of having good work done; the only thing the child knows is that you are hurting him. Dr. Ottolengui has told me that he makes a "sweetheart" of every girl (I mean the children) that comes into his office. That may be; he may treat them very nicely, but he cannot, and no man can, make every child his "sweetheart" and properly fill its teeth, because he must hurt the child in order to do so, and no man will hurt his "sweetheart." (Laughter.)

Then there is another thing, if these teeth are filled with amalgam, doing the best you can,—and that is the great thing, to do the best you can under all the circumstances—the tooth will be preserved until the time comes when the child will appreciate the fact that the filling can be removed, and a proper filling put in. How many of you gentlemen have taken out amalgam fillings and found that the dentine has been hardened? You can scarcely credit it, but many of you have found the dentine hard, although it may be dark in color. What of it, though, if it has been discolored, if it can be filled again with gold? But the tooth itself is no longer sensitive.

Furthermore, it is impossible to fill a child's tooth, as many of the cases present themselves, unless you put on the rubber dam. How few of the children that come to our hands will submit to having the rubber dam placed on the tooth, and in a great many cases the teeth are short; they have not fully erupted and it is a painful operation. You may use local anæsthetics, if you please, but you cannot keep the rubber dam on properly without a clamp, and unless you do that you cannot put in a proper gold filling.

Another thing concerning the filling of children's teeth with gold: You want to retain the respect and love of that child; you want that child to continue your patient during life. If you torture it—and that is the word to use—if you torture that child for an hour or more every day for a week in treating its teeth, what is the result? You may possibly draw such a picture as our essayist has done—and as Dr. Kingsley says, and as we all know he is very clever in drawing such pictures—but the fact is that child will have such a dread of the dentist that you will never again get it into the dental chair. That is one of the greatest reasons for using amalgam and saving the teeth until it is time for them to be filled permanently with gold. I have had a great deal of practice in filling teeth in my life, and the best results I have had have been obtained where I have filled children's teeth with some plastic material, until they

reached the age of twenty or more, then removing those fillings, and filling the teeth permanently with gold. (Applause.)

Dr. Ottolengui. I know, Mr. President, it is usual not to call upon the essayist to speak until the end of the discussion, but I have made an innovation in this instance, and have prepared my paper in two sections, and I now ask permission to read the second volume of this "novel."

The President. You have my permission.

Dr. Stockton. Mr. President, I told you he was using his paper as a detective.

Dr. Ottolengui. I recently met a gentleman who told me that the best way of winning is to have a card up the sleeve, and his experience was that the best card to have up the sleeve is the joker. (Laughter.)

I am not, of course, as Dr. Truman has said, so densely ignorant that I did not appreciate the fact that the argument would be made here, that there is a physiological reason why children's teeth should not be filled with gold, and that thermal changes must be considered and met. I am not an histologist, and consequently I felt that instead of coming here and giving you my own humble opinion on this particular point I would reserve my own views and base my expressions thereon entirely on the clinical aspects of the cases, as I have seen them, and I would go to the men who have made a study of histology, and bring to you today their views on this subject. The second half of my paper comes from Dr. Miller, Dr. Andrews, Dr. Leon Williams and Dr. Broomell.

Some time ago I sent the following letter to each of these gentlemen:

"My Dear Doctor: I have agreed to read a paper before the New Jersey State Society, the subject of which will be 'Should Children's Teeth be Filled With Gold?' In this connection will you kindly give me your views on one point?

"It will be claimed by some that prior to the age of twelve, teeth are in a formative condition, and therefore that they should not receive a metallic filling. With this argument in mind, and considering the tooth to be sound and healthy, with a pulp not dangerously approached, do you believe that there is any physiological prohibition against gold?

"Will you kindly answer this for me with permission to quote you in the discussion?"

The replies which I have are from the men to whom I wrote. I am suppressing nothing, and I shall read you the letters, whether they agree with me or not. In the usual course of events I expect to die some day; but recorded literature lives forever, and I want those who come after me to believe that here today I am not merely trying to establish my own

views, but if possible to learn what is right, and even if this subject has been thrashed out as our deans believe, I would like to ask those gentlemen to show me, in the literature, where it has been settled.

The first communication I read is that from Dr. Miller, and it is as follows:

Is There Any Physiological Prohibition Against Gold in Young Teeth?

Dr. W. D. Miller,
Berlin.

"Supposing the tooth to be fully developed and of good structure, and supposing that the patient has the necessary power of endurance, and that the teeth are not so crowded as to render it difficult to obtain the necessary space without undue wedging, I do not see any particular contraindication against filling teeth of young persons with gold. I have seen cases, however, where the teeth could be carried over the period of greatest activity of caries better by gutta percha or cement than by gold.

"Yours very truly,

"W. D. MILLER."

The next letter is from Dr. Andrews, who says:

Dr. R. R. Andrews,
Cambridge.

"Your letter of February 4th is at hand. In answer to your question I will say: that I do not know of any physiological prohibition against filling young teeth with gold, provided it can be skilfully done 'in teeth sound and healthy, with a pulp not dangerously approached.'

"As you well know, the tooth of a child has an organic element largely in excess of that of a tooth of an adult, and for this reason it has seemed to me wise in the teeth of children to use the adhesive plastic fillings, which I consider as treatment fillings, to last for a few years.

"My main reason, perhaps, is owing to the fact that I find it extremely difficult to permanently fill these teeth with gold. Young children seldom seem strong enough to submit to these long and tedious operations. With kindest regards I am, very truly yours,

"R. R. ANDREWS.

"February 9th."

The next letter is from Dr. Broomell, and it is as follows:

Dr. I. N. Broomell,
Philadelphia.

"The theory that the teeth are in a formative condition prior to the twelfth year, no one will question, and that this process continues much after that period is not a matter of doubt. In fact, I am of the opinion that detinification continues as long as the pulp is vital, not only the thickening of the teeth from without inward, thus decreasing the size of the pulp cavity, but around and about the so-called detinal

fibres, this gradually reducing the proportionate amount of organic material by a gradual reduction in the diameter of the fibres and tubules. If this hypothesis be correct it would seem that the younger the teeth, the greater the vitality in the dentine, and accompanying the approach of adult age and finally senility, vitality in this structure is gradually lessened. It is through the vitality which organized beings possess that they are enabled to maintain their integrity against the hostile entrance of disease, and the amount of vitality should and does exert a controlling influence over such invasion. This argument would appear favorable to the question which you have asked in regard to placing the metallic fillings in young teeth. I have recently advanced the theory that the detinal tubules do not contain fibres or prolongations from the odontoblasts, being therefore a part of those cells, but that these penetrate the tubules to a limited extent only, and that the tubules themselves are filled with a semi-fluid substance resembling the common pulpal substance, and that through this the blood plasma courses, forming a complete nutrient circulation through all parts of the dentine, the anastomosis established at the periphery making this possible. This circulation if present would be most active in young teeth, and any mechanical interference, such as fillings of any kind, would be most favorable to disaster at this period. I think also that the presence of metallic fillings in young teeth, say prior to the twelfth year, are very much more likely to produce a deposit of secondary dentine on the walls of the pulp chamber, than the same size fillings are likely to do in teeth at maturity. It may be that no particular harm results from this additional growth to the dentine on the surface of the pulp, but the longer the filling is in position the greater will be the secondary deposit, and if we expect ill effects produced at all, the larger the growth, the greater the pathological result.

"I. N. B."

I wrote Dr. Broomell that either I was very stupid or else he was on both sides of the questions, and in reply to that he wrote as follows:

"Yours of the 23d received. You are not stupid, but extremely wise when you say that you do not know upon which side of the argument I stand. While I favor the theory that metallic fillings in young teeth are more or less harmful, I did not feel that I had given you anything positive by which to prove or even justify such a position. Neither am I able to do so now. Just as I stated in the contribution sent you, one argument would favor placing metallic fillings in young teeth, while the other would not. I suppose it is a poor student who always looks at such matters from two standpoints. But I believe that this is the only way that anything definite can be accomplished, and until something definite has resulted I see no harm and in fact would much prefer to present an

argument on both sides, rather than keep one of these back in an effort to strengthen the other. If I were present at a dental meeting, and the chairman were to put the question asked, I would vote in the negative."

So you see he is against me.

I will now read you Dr. Leon Williams's letter. He says:

Dr. Leon Williams,
London.

"You ask me if there is, in my judgment, any physiological reason why the teeth of children under twelve years of age, in all cases where the pulp is not dangerously exposed, should not be filled with gold. I can only answer your question directly by saying, no. But that negative answer by no means completely represents my views or my practice on this subject. I use gold in but a small proportion of cases of children under twelve, and I should like to make my reasons for this practice perfectly clear. It is, I believe, a matter of knowledge of common observation that children's teeth are not as easily saved by the use of gold as by the employment of other filling materials. Please note the form in which I put this statement. I say, '*Not as easily saved,*' and that expresses the whole gist of the question. But the full significance of that expression is, I think, not generally recognized. There is here no question of incompatibility of material and tooth substance. There is no filling material at present in use more compatible with tooth substance than gold, when the greatest possible advantage is taken of that material. But just there lies the difficulty. Let us state at once and emphatically that in the successful manipulation of any filling material we are working to microscopic degrees of fineness. That is the one important fact that should always be in view. The causes of caries are microscopic in their nature and therefore defects so small as to be quite beyond the scope of ordinary vision are yet quite sufficient to provide favorable conditions for the activity of these causes of decay. Now, who can claim to be able to manipulate gold to this requisite degree of microscopical perfection? Fortunately, in the mouths of adults in most cases, the activity of the causes of decay are greatly reduced, and decay may be excluded for many years, although the work be not microscopically perfect. But in the mouths of most children of the present day the bacterial causes of decay are so active and energetic that they quickly seize upon microscopic defects, and their destructive work proceeds rapidly. The whole matter of the value of filling materials may be adequately and completely summed up by saying that *the most valuable material is that which will most perfectly exclude the action of caries-producing bacteria.* But, you see, the personal factor figures largely in this problem. Many years ago I had several gold fillings inserted in my own teeth in positions where decay is most likely to recur. Those fillings are still excluding caries.

I have since had other teeth filled in more favorable situations and some of these fillings have failed to exclude caries. Clearly the difference was entirely due to the manipulation of the gold, and the method of forming the fillings. The conditions for saving the teeth are, as a rule, more unfavorable in the mouths of children than of adults, therefore the work of filling, to be successful, must be more perfectly done. The working of gold to that microscopical degree of perfection necessary to the full utilization of its good qualities requires vastly more care and skill than is necessary with the plastics. For this reason and this alone gold is not the best material for the great majority of operators. I have not mentioned the power of gold to conduct thermal changes, because you excluded that in the form of your question by confining your inquiry to those cases in which the pulp was not dangerously approached. But even in cases when decay has dangerously approached the pulp, this organ can be perfectly protected by the use of asbestos felt covered with oxy-phosphate cement.

"And so the solution of this problem, I believe, remains like this: For those who wish to produce the absolutely best results regardless of the expenditure of nervous force of themselves and their patients, and who believe that they can produce microscopically perfect results, gold is the best material to use at any age of the patient.

"I am, dear sir, yours faithfully,

"LEON WILLIAMS."

These letters practically constitute a reply to
Dr. Ottolengui. the points brought out by Drs. Truman and Stockton, and I wish to add my own quota.

Dr. Williams correctly understood me, while Dr. Truman, from hearing the paper instead of reading it, did not. The teeth that I have more particularly said should be filled undoubtedly with gold, or exclusively with gold, if it were possible to do so, are what I have called the initial cavities in the six year molars; I have also said that in proportion as the cavity deepens, gold would be less useful.

Dr. Truman brought up the subject of thermal changes. In the first place, it is a mistake to suppose that oxy-phosphate, or any of the cements, or even gutta percha, are non-conductors. They are poorer conductors than gold; they are, if you please, poor conductors, and in that sense they are better; but conductivity, I take it, without going deeply into the subject, will depend largely on the character of the material through which the heat passes. That will be very fully overcome in your gold fillings by following the advice of Dr. Williams, and placing an insulation under the filling, and as far as possible lining the cavity with oxy-phosphate, and then filling with gold; and you will find that

a gold filling with oxy-phosphate between it and the tooth substance, will be a poorer conductor than an oxy-phosphate filling pure and simple. (Applause.)

Dr. Rhein. After listening to the discussion thus far, I desire to bring up one point in opposition to the remarks made by Prof. Truman, and that is in connection with what he said of the difference between hard and soft teeth, and the objection, as I understood it, to the use of gold in what is commonly known as a soft tooth. It is not my purpose to enter into the discussion which was brought up by Prof. Black, in regard to there being no difference on that point. Clinically, as an operator, I agree with Prof. Truman that a certain class of teeth are in such a condition that the enamel portion of those teeth continually gives way even though we put the most perfect filling into the tooth, and that is more commonly noticed in the teeth of young children at the age of the patients under discussion at the present time. That an area of caries may start up around the filling, due to some inherent defect, perhaps in the enamel rods, or for some cause that I do not care to go into at the present time. But the point I wish to bring out is that that very class of teeth known as soft teeth, if it is possible to have the young patient submit to a gold operation, demands gold filling in preference to any other kind of filling, because it is the only material, if correctly used, which can successfully treat such teeth in an initial operation. It is the opposition of Dr. Truman to the principles laid down by Dr. Ottolengui in his paper which makes me reply so strongly to this one point. It has often been brought up in dental discussions, and it is not the first time that I have answered it in this way. If we desire to preserve the so-called soft tooth in the condition in which we meet it, there is no filling that will do it as gold will, if properly manipulated, and there is no other filling material that can be manipulated properly for such a tooth. The reason of that rests in the manner in which such a cavity must be prepared. There is no filling material that can be worked over the edges of enamel, and remain there permanently, except gold. It is impossible to lap over the edges of enamel after you have bevelled them, and removed that dangerous area which you find in that particular class of teeth, except with gold; that is the only way in which they can be permanently saved, and I say there is but one material that can be properly manipulated so as to get a safe margin in those teeth.

It is immaterial to me at the present moment whether the majority of practitioners favor this side of the matter or not. I agree with the essayist that this subject is one that the records of dentistry in the past or future will either verify or disprove.

I also am in great discord with the idea of bringing up such an argument as, "this is thrashed out." It is not a thrashed out subject. Every subject in dentistry is as old as dentistry itself. If you look back at the writings on dental subjects as far as the fifteenth or sixteenth centuries you will find discussions on the very topics that interest us today; they were the active topics of discussion at that time. But that does not mean the problems have been solved; it does not mean that the observation of any single individual can settle this subject. But there is one point that we can agree upon: We know what can be done with certain filling materials. We know the limitations of amalgam; we know that we cannot go over the edges of enamel margins with any thin film of amalgam, or prepare it so that it will stand the strain of any subsequent wear or stress; we know that gold will stand such strain, and stand it permanently, if it is introduced in the manner in which it should be; and that is the strongest argument I know of that can be made in favor of the position taken by the essayist.

I suppose I have been called upon to represent
Dr. J. Allen Osmun, the younger element after these old chaps have had
Newark. their innings. (Laughter.)

I am very much interested in the subject of the essay, because it recalls twenty-nine years of experience in dentistry of my own. When the dictum that there was no difference between soft and hard teeth was pronounced I was a young practitioner, and I fell a victim to it, and I want to raise my voice in warning to the younger men not to take radical statements of that kind in their entirety. Remember that men who write papers like that qualify their statements in their own minds, but we have to take it as we hear it. Let us try and be conservative.

This statement of Dr. Black's reminds me of a story I once heard of a gentleman who was fishing down in Maine, and wrote to a certain professor, a friend of his, stating that he had caught a brook trout of a certain size and weight, and was met by the reply that science proved that brook trout did not grow in that region to any such size. The gentleman caught another brook trout still larger and heavier, preserved it in ice, and sent it to his friend, the Professor, who sat down and wrote to him, saying, "Your brook trout is received. The theory of a lifetime has been knocked stiff by one fact." So it is sometimes with theories in dentistry, when confronted with the facts.

The longer I am in practice, wherever it is possible to do so, I use gold for fillings. Wherever you can, whether with man, woman or child, in every case possible, use gold and you will get the best results, provided you do your duty as an operator. The essayist has said that no

man practicing hour after hour and day after day can always reach an ideal. That may be true, but that does not affect the principle involved; it is a question of a man's own ability. The less you use amalgam, the more your patients will love you and the more respect you will have for yourselves. (Applause.)

Dr. S. Freeman,
New York.

As I have listened to this discussion, *pro* and *con*, I have found that Dr. Ottolengui built a stronger wall when he read the first part of his paper than some of you have recognized. He covered his ground by stating circumstances and conditions, and you will agree with Dr. Ottolengui in everything he said until he got to be so radical in his statements, but he protected himself when he said "circumstances alter cases," and if you gentlemen look over the paper carefully, when published, you will find that he was not as radical in his position as the latter part of his paper seems to make him.

Dr. Ottolengui.

I have written so much in antagonism to Dr. Black's views that when I could agree with him it did seem to me it would be acting a little short of my duty if I did not do so. But I do not think that the matter of hard and soft teeth has been taken just exactly as expressed in my paper. I did not say, nor do I think I am quite so ignorant as to say, that there is no difference between hard and soft teeth. I said that there is no difference in hard and soft teeth *in relation to the filling of them with gold*; that there is no such thing as a tooth being too soft for gold, nor a tooth that would not stand gold on account of its density or lack of density.

The difference between a hard and soft tooth is merely a difference in the minute structure of the tooth, and not a very great difference in the proportion of the various constituents in that tooth. So far as caries pure and simple is concerned, if the environment is one of caries, the hard tooth, one that will destroy your burrs and make you wish the dental depot men would learn how to make burrs that would cut; that kind of tooth will succumb to decay. The soft tooth will not decay any more rapidly because it is soft. As caries progresses the enamel outside, losing its support and being more friable, much more rapidly breaks down, and apparently the cavities grow very much more quickly. Consequently I must modify what I said when I remarked that there is no difference between hard and soft teeth in the matter of filling them with gold. I simply meant that both can be filled with gold. Dr. Rhein is quite right, and there is a difference, and soft teeth demand gold about twice as much as hard teeth; they demand the protection over the edges that only filling with gold will give them.

Dr. Rhein said that a good amalgam filling, properly placed, ought

to save the tooth. Why not? My argument against the use of amalgam in young teeth was not that good amalgam fillings could not be put in teeth so as to save them; but that they *are not* put into teeth so as to save them; that 99 per cent of the amalgam fillings put in young teeth do not save them, because the cavities are not properly prepared. The same reason that makes a man use amalgam, is the one that prevents him from cutting out the cavities and preparing them properly.

Dr. Rhein's proposition is that if the cavity is properly prepared, thoroughly cut out, and the amalgam properly put in, it will save the tooth. But let us look at that a moment, 'if the cavity is properly prepared,'—but you have been "hurting your sweetheart" when you properly prepared that cavity, and that is the end of the game! If you realize that to do that kind of amalgam work which Dr. Rhein tells you will save the tooth, means the cavity properly prepared, the amalgam properly inserted and properly polished, you will know that you require at least two sittings. At the first sitting, in either case, you prepare that cavity, and if you are afraid your "sweetheart" will throw you over because you have hurt her very much, I have not the least objection to your putting in a little gutta percha and letting her come again next Thursday at 11 a. m., and then put in a gold filling; and that won't hurt your sweetheart the least bit in the world, and you have the gold filling, when you get through, instead of amalgam, and I hope the gentlemen will at least admit that gold is just as good as amalgam!

I can put a good gold filling in an initial cavity in a six year old molar, just as easily as I can put in a good amalgam filling, and in one sitting nearly always; sometimes in two. Sometimes in two sittings, with six or eight months between, so that we do not hurt the poor little dear with that awful clamp! But I use the clamp all the time, and most of my little girl sweethearts kiss me goodby.

And this brings me to the statement made by Dr. Kingsley. We have all known Dr. Kingsley as an orator for a great many years, and we know that he likes to have his little joke, and it has been a great pleasure to me to afford Dr. Kingsley an opportunity of having his little joke. I think I laughed a little louder than anybody else! But there is another side. Dr. Kingsley said he remembers a patient, whom I have forgotten; a patient for whom I put in an amalgam filling. As I have forgotten the child, I do not know whether it was an *initial* cavity, but as Dr. Kingsley does remember the case, it must have been one of Dr. Kingsley's patients, and it is very likely the tooth was so filled under Dr. Kingsley's direction, and that was Dr. Kingsley's practice and not mine. I do not think that militates at all against my argument. (Laughter and applause.) You see we do not all of us have a monopoly

of recollection; the Doctor says I have a first-class forgetfulness. Well, I know that it is sometimes very convenient! As you will remember, Dr. Kingsley told you my last book was called the "Crime of the Century," and he has only just found out what the crime of the century was. Now, that was not my last book; my last novel was called "Final Proof," and Dr. Kingsley has not brought us any "Final Proof" about that amalgam filling. (Laughter and applause.)

I want to say in closing that in spite of all my efforts, of course the matter is not finally settled; but I ask the gentlemen present, and especially the younger men, to try it. Try to put gold fillings in children's teeth. The purpose of that is the experience which such practice brings. The things that we do all the time we perhaps come to do a little better than those who do not do them. Those who come under the teachings that children's teeth must be filled with amalgam, and gold used later, have less experience in filling children's teeth with gold than myself, since I have made it a rigid rule to use gold as the practice and other materials as the exceptions. If you will just change your practice and make gold your rule, when you get grayheaded you will have a whole lot of children whose teeth you have filled only once.

The following applications for membership were received:

Dr. Robert A. Sheppard, Englewood, N. J.; sponsors, Drs. Beemer, Valentine and Duffield.

Dr. Frank W. French, Plainfield, N. J.; sponsors, Drs. Sanger, Duffield and Meeker.

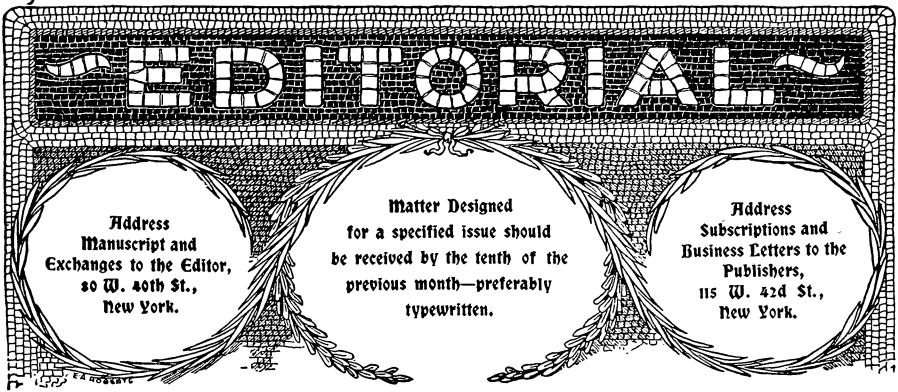
Dr. Guy H. Hillman, Plainfield, N. J.; sponsors, Drs. Sanger, Duffield and Meeker.

Dr. Lionel W. Honaburger, West End, N. J.; sponsors, Drs. Sanger, Duffield and Meeker.

On motion referred to Committee on Membership.

On motion adjourned until 8 o'clock p. m.





Canadian Dental Association.

The Canadian Dental Association was organized in Montreal in September, this new body being intended as the representative national society of the Dominion. The attendance at this meeting was large and must have greatly flattered those who originated and managed the enterprise. In regard to numbers a most significant fact is to be noted. There are only about two thousand dentists in all Canada, yet two hundred and eighty men signed the roll of membership in this new Canadian Dental Association. This can only be properly appreciated by comparison with conditions in this country. Basing an approximation of the number of dentists practicing in the United States upon available statistics we find that there are not less than thirty thousand dentists here. Figuring in the same ratio, therefore, we ought to have over four thousand members in our National Dental Association. By comparing the real total with this calculation we cannot but find in the apparent insignificance of our own membership a source of great congratulation to our neighbors to the north that they should begin with so tremendous a stride, especially as an analysis shows a proportionate membership from the several provinces.

**Unification of
Dental License Laws.**

One of the avowed, and perhaps the most prominent purpose, of the Canadian Dental Association, is the unification of the present dental laws, so that a practitioner may legally engage in the pursuit of his profession with equal rights in all parts of Canada. Despite the fact that Canada is a part of the British Empire, her provincial and dominion parliaments are quite analogous with our own system of political rule, and the local laws are quite as diverse as they are in the States. In short, very nearly the same problems are to be met in Canada as here, and we may therefore watch the progress of events across the border with more than usual interest. One thing we may say. The Montreal meeting was opened with the reading of papers on the subject of dental laws and the problems involved in the attempted unification, the authors being delegated one from each province. It was manifest from the outset that these men had given careful study to their subjects, each presenting a concise and well digested *résumé* of the status in his own province. All the papers were well considered, logical and temperate. Their language was exceptionally admirable; indeed with all our self-confidence and local pride in what we have come to denominate American dentistry and American dentists, it is scarcely probable that an equal number of writers could have been collected at one meeting in this country whose papers would have reached the same literary standards. Indeed it was noted that as a whole the English of all the papers presented at this meeting, from the pens of Canadians, was much above the average of that with which we are usually regaled in America.

**Features of
the Meeting.**

The meetings were held in one of the many buildings on the campus of McGill University and the papers and discussions were of a practical and instructive character. The guests of the Association from the United States were Drs. Johnson of Chicago, Price of Cleveland, and Ottolengui of New York. While ample time was spent in attendance at scientific sessions and clinics, the occasion was made agreeable and memorable by the character of the entertainments furnished to the visitors by the local committee. These included a visit to the top of the mountain, the sides of which form a beautiful park, a luncheon in the open air being served. On another morning a trolley

trip was arranged, special cars taking all who desired to go, on a trip about the city, the principal streets being thus traversed. The Montreal Dental Club also entertained the guests at a set luncheon, covers being laid for one hundred. On one evening a magnificent banquet was served in the large hall of the Windsor Hotel, about five hundred attending, of whom one-third were ladies. This proved to be a most delightful innovation and an example that might be advantageously followed in this country by committees seeking for a pleasurable novelty. The speakers scheduled to respond to toasts included a Cabinet Minister, and the Mayor of Montreal. Would the high politicians in this country so honor our profession?

Not the least of the many enjoyable entertainments was one proffered by one of the leading society matrons, who threw open her magnificent house, with its picture gallery and lawns to the visiting dentists, at an afternoon reception, the ladies being also invited. The lawns were liberally supplied with chairs, and tables all loaded with refreshments, while innumerable oriental rugs spread on the grass and several beautiful parrots of various species and gorgeous plumage, furnished a color scheme at once artistic and pleasing.

If this is a fair sample of a Canadian dental meeting it is only too evident that our neighbors have nothing to learn from us either in scientific management or in hospitality. We wish editorially to extend our heartiest congratulations to our Canadian brethren upon their most marvelously successful organization of a national association. May the Canadian Dental Association elevate the dentists of Canada to that high place to which they so evidently belong.





With malice
toward none,
with charity
for all

Questions will be answered in this department, provided the answers would be of general interest. After publication our readers are cordially invited to make further reply, criticism or comment.



It is commonly supposed and commonly taught that the best material for use in obtaining accurate impressions of the mouth is plaster of paris, and there is no doubt that where it can be utilized it should be the choice. Occasionally, however, circumstances arise where it cannot be relied upon exclusively.

A Problem in Prosthodontia

The following is a record of a case which has recently passed through my hands, and is here given because the solution of the

difficulties presented is so obviously available in the presence of similar obstacles. The patient was an elderly man who had lost his four lower incisor teeth. He was wearing artificial substitutes with which he felt entirely satisfied, yet an examination disclosed the fact that the plate in use was slowly but surely causing the loss of his remaining teeth. The dentist who had served him had evidently taken an impression with plaster of paris, but the positions of the natural teeth, together with other conditions had combined to

prevent his succeeding in obtaining an accurate model. The cuspids were fairly erect; the first bicuspid's leaned towards each other a little; the second bicuspid's tipped at a greater angle and the molars still more so. Of course this tipping would not necessarily prevent an impression with plaster, as the fracture would not have been a great hindrance. It is mentioned in another connection. The gums along the lingual aspect of the teeth had greatly receded, so that the natural teeth appeared excessively long. There was an abundant flow of saliva, and a restless tongue. The result of an attempt to take an impression with plaster was that a fairly good impression of the teeth themselves was obtained, as well as of the gum in the anterior part of the mouth, where the incisors were missing; but from the region of the cuspids, backward, the impression grew less and less accurate, because of the fact that the tongue and saliva had combined to wash away the plaster before it had time to harden. The resulting model disclosed the lingual aspect of the teeth, but about the bicuspid's and molars there was no representation of gum tissue. Of course it might have been possible, with a knife to place a large mass of partially set plaster along these surfaces prior to inserting the tray, but it seemed undesirable to use so great a quantity of material around teeth which were long, tipped together and loose, because of the difficulty of procuring fracture and ready removal from the mouth.

The previous attendant had apparently used the model as he found it and the denture which he supplied rested on the gum in the incisive region, but did not reach the soft parts at all along the lingual aspect of the teeth. The result was that having taken advantage of the inward tipping of the side teeth he was enabled to lock the fixture into position, at least for a time, but as the plate along its sides rested solely against the teeth, in every movement of mastication it operated as a wedge pressing forward and outwardly against the natural organs. The inevitable effect of a denture so retained was only too plainly to be seen; the two cuspids, which resisted the greatest force of the stress were already so loosened that a careless observer might have attributed the looseness to pyorrhœa, whereas, as a fact, they were merely growing less and less stable because of the constant stress, and the lack of bony support due to the recession about their necks.

The procedure, which brought a most gratifying success, was as follows: Separate impressions of each side of the mouth were taken in plaster for the procurement of models upon which to form the Bonwill clasps upon which reliance was to be placed for retaining the appliance. A third impression was taken with modeling compound, one that sets hard, and this was chilled with cold water prior to removal. It was fully

comprehended that this would be inaccurate in regard to the teeth because of the draw, but it was expected that a moderately accurate impression of the gum tissues would be had.

The model was poured, and the teeth cut off entirely, it being the intention not to permit the plate to touch the natural teeth in any place. Dies were made and a plate struck of pure (unalloyed) platinum of 28 gauge. This metal of course is quite soft. Having trimmed this to the desired shape, it was placed in the mouth, and, as anticipated, it did not fit satisfactorily. A plate of harder material, such as gold or iridio-platinum would not have served. But the platinum being soft was readily pressed to accurate adaptation to the soft tissues, using the forefingers of the two hands and working them both at the same time along the opposite sides of the mandible. This accomplished, the plate was carefully removed from the mouth to avoid bending; plaster was poured upon it, thus securing a model which it would fit; this was reproduced in zinc and used as a guide die to prevent alteration of shape during the subsequent steps. A stiff platinum wire was laid against the plate on each side, but not in the center. These stiffening bars were fastened by flowing twenty carat gold plate over the platinum plate and bars, the two sides of course being done separately. The center being still soft, the plate was easily readapted on the zinc die thus making sure that no warpage had occurred. Gold was then flowed over the central area, the ends being kept moderately cool. The plate thus stiffened throughout was found to fit the die accurately, without need of swaging, which, however, could have been relied upon to make restoration to the true shape had it been necessary. Tried in the mouth the adaptation proved to be accurate, and the appliance was completed, Bonwill clasps on each side serving not only to hold the plate in place, but likewise acting as a brace for the slightly loosened bicuspid and molars, while from the fact that absolutely no bearing now causes stress against the cuspids, it is fair to anticipate that these will become tightened.

The following is published at the request of

Dr. Haskell

Dr. L. P. Haskell of Chicago:

Asks a Few Questions.

"1. Why dentists use the so-called 'short bite' teeth? Often in selecting teeth I pick up a handsome face tooth thinking it is just what I want, but upon turning it over I am disgusted to find that it is one of those abominations, the 'short bite' tooth. Upon inquiry I am informed that some dentists use very many of them. In all my experience in full dentures I have yet to see the case where such teeth are needed, and on the other hand I find them very objectionable. They are entirely contrary to nature, and also interfere with the tongue by having such a

thickening near the ends of the teeth. Will some one explain why they use them?

"2. In plate teeth, both gum and plain, the pins are nowadays, almost always crosswise. In speaking of this at the depots I am informed it is because the dentists demand it. Will some one inform me why? It is very objectionable from the fact that it greatly weakens the teeth. Often a narrow thin tooth is thus made very fragile. Of course if dentists want them they must be furnished, but that those who do not want them should be compelled to use them is wrong, and the makers should be made to see to it that a fair proportion of teeth should have the pins arranged the other way.

"3. Why is it that the mass of dentists use, without protest, the bicuspsids and molars that are so out of all proportion to the fronts in a majority of sets? Take the teeth of the oldest manufacturer for instance and with nearly 100 molds of upper rubber bicuspsids and molars the greater part of the sets are sent out with narrow, thin teeth and with but little porcelain above the pins, even in long teeth. It would seem with all these years of experience better results could be secured. But so long as dentists use them without protest, the evil will not be remedied. Fortunately there are makes of teeth where this fault is largely remedied.

"4. Why is it that after all these years of experience the dentist fails to find certain shades of natural teeth, especially among the yellows? The fact is they are retrograding. Shades once made are no longer to be found, except in the newer makes of teeth.

"5. Why is it in looking over an assortment of bicuspsids and molars, in sets, the majority of them are light, often white, while the back teeth should always be darker than the fronts?

"6. Why cannot sets be made with the cuspsids and molars gradually darker than the incisors, like nature?

"Will progressive dentists rise up en masse and demand a change?"

Dr. A. L. Pucky, of Waterville, N. Y., sends us the following communication in relation to his experience with zinc in vulcanizing. "I have a Snow index gas regulator dental vulcanizer. I have read so many recommendations to use zinc during vulcanizing in order to keep the flasks clean that I determined to try it. The experiment was tried in connection with a full set of teeth. I placed the zinc with the flask in the vulcanizer and set regulator at 320 degrees, and when this had been nearly reached, went home to supper. I returned in an hour and a half, and my nostrils were at once assailed by the odor of burning rubber. On opening the vulcanizer, I had as the result of my labors twenty-

**Danger of Using
Zinc in Vulcanizers.**

eight teeth and a very hot sensation under my collar. I therefore would advise against the use of zinc with this class of vulcanizer, though it may be safe perhaps with the ordinary kind. It is a doubtful advantage at best as the zinc will decompose hot water and evolve hydrogen gas if the air is expelled (as in the Snow vulcanizer); thus the vulcanizer is soon filled with hydrogen gas and the thermometer fails to register the true degree of heat. Again the hydrogen soon fills the steam space and exerts more pressure than the steam. My present method of keeping flasks clean is to dissolve shellac in alcohol and having the flasks thoroughly clean, paint the solution on the flasks."

Rapid Method of Making Shell Crowns. Dr. F. B. Olwin, of Hammond, Indiana, thus describes his method of making a shell crown quickly. "I have been much interested in the excellent articles by Dr. Hart J. Goslee, and as this subject of crowns and bridgework is now before the readers of *ITEMS OF INTEREST* I venture a description of the following method. Often I meet patients who cannot afford the time required to make a crown by the usual method. In these cases I prepare the root, secure measurement of same with wire and solder a band. The band is then fitted on the root and properly trimmed and contoured. Place the band in position in the mouth and fill with compound, or whatever the operator may prefer for carving cusps. Have the patient close the mouth, then remove and carve cusps to desired shape, and you at once have the model with which to make dies and complete the work."

The above communication is published because it may prove popular with some of our readers. It is not apparent, however, that it has any time saving qualities over the method described by Dr. Goslee. Indeed it would seem that the patient must remain at least as long in the accomplishment of this, or longer if the band is tried in the mouth after carving the cusps, than by Dr. Goslee's process where, the band being in place an occlusive bite is taken, and in the absence of the patient occluding models are made and the cusp carving done with the articulated parts as a guide to accuracy. Perhaps, however, Dr. Olwin means that he completes the crown in one sitting, the patient waiting, in which case of course some time is gained.

Treatment of Fistulous Tracts. In relation to the treatment of fistulous tracts, Dr. James F. Wessels writes as follows in the *Dental Brief*: "It is surprising at times how pus will burrow through or between tissues. Usually it follows the line of least resistance; and gravity, at times, has an influence. Now and again it makes its exit far distant from the seat of trouble. Some time ago I was consulted in a case where a young lady had long suffered

from a dull heavy pain on the right side of the head and upper jaw. For two years she had been under treatment for chronic post-nasal catarrh, and her general health had been on the decline. I was led to suspect that a tooth with a devitalized pulp might have something to do with it, and on examination with an electric mouth-lamp found the right central a little off color; otherwise the tooth seemed normal. In tapping, this tooth seemed no more sensitive than its fellow, but I noticed a slight difference in the sound. I cautiously drilled into it and found the pulp devitalized and decomposed. After cleansing the canal, I injected into it a solution of phenol sodique and was surprised to find that it made its exit through an opening just in front of the uvula. She told me that she had spent over two hundred dollars for treatment of catarrh without relief. The case responded kindly to treatment, and in about two months the abscess seemed to have healed, and the patient's health was very much improved."

In the year 1899, at Niagara Falls, the New Jersey Examining Board created a sensation by **The Vindication of Dr. Chas. Meeker.** tendering their resignation from the National Board of Dental Examiners. In the discussion which ensued they were asked whether their State Society knew of their intention and replied that they did not consider that the Board was amenable to the State Society. On this point, at the time, we made the following editorial comment:

"Have these gentlemen forgotten how they obtained their preference? Was it not through the votes of their fellows in the State Society? Had they expressed these views prior to election would they have been elected? Is it conceivable that a State Society would choose as examiners, men who would not be 'amenable' to the parent body? Is it probable that when the great State of New Jersey placed the selection of the dental examiners in the care of the State Dental Society it meant the State Society to have no further control over their acts? The view is not tenable since the State not only entrusted the society with the power of electing these gentlemen, but it likewise gave the society the option of not re-electing them."

These have proven to be prophetic words. It was common rumor at the time, that the real motive which instigated the resignation from the National Board was the desire to remove Dr. Meeker from the position of Secretary, since of course he could not retain an office if deprived of his membership. The National Board, however, did not adopt the view that State Boards are not "amenable" to the State Societies which appoint them, and voted to lay the resignation on the table for one year, in order that the New Jersey State Dental Society might express its

views. The result was that at the next annual meeting, the New Jersey Society "persuaded" its "non-amenable" Board to withdraw its resignation. Since then at each annual election they have declined to re-elect the retiring member until today but one is left on the Board.

By a curious coincidence the cycle had just been passed when the National met again at Niagara this summer, and unanimously elected Dr. Charles A. Meeker to be President. And at the meeting of his State Board just held he was likewise made President of that body. Thus a lesson is given to State Boards in general and they should understand for the future that they are not more powerful than their creators, the State Dental Societies.

Dr. W. D. Miller, an American, professor of dentistry at the University in Berlin, won the golf championship of Germany and Austria, by 2 up, on the Berlin Club's links. Professor Andrew, of Edinburgh University, who is temporarily living in Berlin while studying the German school system, was second.—*N. Y. Herald.*





Dr. Benjamin Franklin Arnold.

Dr. Benjamin Franklin Arnold died of heart disease at his residence in Providence, R. I., on Sept. 10, aged seventy-three years, seven months.

Dr. Benjamin Franklin Arnold was the son of William P. Arnold and Alma Green (Briggs) Arnold, and was born in Westerly Jan. 26, 1829. During his early boyhood he lived for a time at Niantic, from which place he went to Newport and studied dentistry under the late Dr. A. A. Saunders of that city.

In 1857 he came to Westerly and opened a dental office over the store of J. H. Lewis on Main Street. From this location he removed to the old Segar Block on Broad Street and for nearly thirty years practiced dentistry there. Recently he removed to the Barber Memorial Building on High Street and up to the time of his death was actively engaged in his profession. At the time of his death he was the oldest practicing dentist in the State, having been in the business forty-five years.

On Sept. 29, 1853, Dr. Arnold was married to Miss Mary Ann Saunders of Charlestown, who died Dec. 18, 1880. To them four children were born—Miss Martha E. Arnold of Westerly, John Franklin Arnold, now deceased, Dr. Thomas B. Arnold of New York, and Dr. Fred L. Arnold of Providence. On June 16, 1886, Dr. Arnold was united in marriage to Mary Louise Coon of North Stonington, who survives him.

For nearly forty years Dr. Arnold was a member of Franklin Lodge, No. 20, A. F. and A. M., having joined Jan. 14, 1863. He was a charter member of Granite Council, No. 177, R. A., which society he joined on Oct. 14, 1878. In this order he held the office of regent and collector for many years.

In his early manhood he became associated with the Calvary Baptist Church and until his death held his membership in that church, always

living a consistent Christian life. He was a man who won the admiration of all who knew him. His sudden death came as a shock to his relatives and friends, but was the closing of a life well spent.

Dr. George S. Seymour.

At a meeting of the dentists of Louisville, held at the office of Dr. B. O. Doyle, Friday, Sept. 26, 1902, the following resolutions were adopted:

"In the midst of life we are in death."

The Angel of Death cometh at a time when no man can tell. Truly has he come to summon our associate and co-laborer, Dr. Geo. S. Seymour. Mingling with him but a few hours ago, we are suddenly shocked by the announcement that he has gone from among us.

While we bow in humble submission to the will of Him, who doeth all things well, we desire to give expression to our sense of the loss our profession has sustained in the taking from our ranks of one who for many years has labored in this community, standing ever ready to maintain the honor and dignity he felt was so justly its due. Therefore, we are here assembled to honor his memory, and extend to his wife and family our earnest and most tender sympathy in this hour of their sad bereavement.

Resolved, That a copy of this preamble and resolutions be sent the family and furnished the dental journals and daily papers for publication.

Dr. CHAS. E. DUNN,
Dr. C. G. EDWARDS,
Dr. J. H. BALDWIN.





State Society Meetings.

Colorado State Board of Dental Examiners, Denver, Colo., Dec. 2.

District of Columbia Dental Society, Washington, Dec. 16.

New Hampshire Dental Society, Concord, Nov. 11, 12, 13.

Ohio State Dental Society, Columbus, Dec. 2, 3, 4.

Ohio State Board of Dental Examiners, Columbus, Nov. 25, 26, 27.

Pennsylvania Board of Dental Examiners, Philadelphia and Pittsburgh, Dec. 16-19.

Ohio State Dental Society.

The thirty-sixth annual meeting of the Ohio State Dental Society will be held in Columbus, Dec. 2, 3, 4, 1902. This promises to be one of the largest meetings in the history of this Society. Prominent members of the dental profession will present papers and some of the most noted clinicians will operate. Arrangements have also been completed for one of the most extensive exhibitions of dental aids and appliances ever seen. A veritable exposition of dental arts and manufactures. Members of the profession are cordially invited.

OTTO ARNOLD, Pres.,
Columbus, Ohio.

S. D. RUGGLES, Sec'y.,
Portsmouth, Ohio.

The Florida State Dental Society.

The twentieth annual meeting of the Florida State Dental Society will be held at Seabreeze Beach, May 27, 1903.

List of Standing Committees, 1902-3: Operative Dentistry—Dr. J. E. Chase, Ocala, Chairman; Dr. W. G. Mason, Tampa, Secretary.

Dental Education and Literature—Dr. W. E. Driscoll, Braidentown, Chairman; Dr. Wilmer S. Hall, Pensacola, Secretary. Essays and Voluntary Papers—Dr. R. L. McMullen, Clearwater, Chairman; Dr. Alton B. Whitman, Orlando, Secretary. Pathology and Surgery—Dr. J. E. Miller, Palm Beach, Chairman; Dr. J. A. Giddens, Tampa, Secretary. Physiology and Etiology—Dr. R. A. Shine, Tallahassee, Chairman; Dr. E. M. Sanderson, Jacksonville, Secretary. Dental Chemistry and Therapeutics—Dr. H. R. Estes, Palatka, Chairman; Dr. L. C. Elkins, St. Augustine, Secretary. Mechanical Dentistry—Dr. Carroll H. Frink, Fernandina, Chairman; Dr. Guy C. Estes, Palatka, Secretary. Clinics—Dr. C. C. Collins, Atlanta, Chairman; Dr. W. S. Taylor, DeLand, Secretary. Arrangements—Dr. D. D. Beekman, Chairman; Dr. Geo. E. Morden, Dr. Edith Brush, all of Daytona.

NOTE.—It is urgently requested that all members, whether on committees or not, will contribute papers or clinics, communicating their willingness to the chairman of the committee to which they wish to be assigned.

D. D. BEEKMAN, D.D.S., Secy.

Dr. J. D. L. TENCH, D.D.S., President.

New Hampshire Dental Society.

The New Hampshire Dental Society will hold its annual meeting at Concord, N. H., Nov. 11, 12 and 13. All members of the profession are earnestly requested to be present.

FRED F. FISHER, Sec'y.

913 Elm Street, Manchester, N. H.

The South-West Virginia Dental Society.

The Southwest Virginia Dental Society was organized at Roanoke, Va., Sept. 5, 1902. Chaplain H. Carson, D.D.S., of Roanoke, Va., was elected president, and Richard L. Simpson, D.D.S., of Fincastle, Va., was elected secretary and treasurer.

State of Connecticut Dental Commissioners.

The Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford, on Tuesday, Wednesday and

Thursday, Nov. 11, 12 and 13, 1902, respectively, to examine applicants for license to practice dentistry, and for the transaction of any other proper business.

The practical examination in operative and prosthetic dentistry will be held Tuesday, Nov. 11, at 9 a. m., in Putnam Phalanx Armory, corner of Haynes and Pearl Streets.

The written theoretic examination will be held Wednesday and Thursday, Nov. 12 and 13, at the Capitol.

All applicants should apply to the Recorder for proper blanks, and for the revised rules for conducting the examinations.

Application blanks must be carefully filled in and sworn to, and with fee, twenty-five dollars (\$25.00), filed with the Recorder on or before Nov. 4, 1902.

By direction of the Dental Commissioners.

J. TENNEY BARKER, Recorder.

Ohio State Board of Dental Examiners.

The Ohio State Board of Dental Examiners will meet at the Neil House, Columbus, O., Nov. 25, 26 and 27, to examine applicants for registration. Applications should be filed by Nov. 15.

For full particulars and application blanks address the Secretary.

112 East Broad Street, Columbus, O. H. C. BROWN, Sec'y.

Pennsylvania Board of Dental Examiners.

The Board of Dental Examiners of Pennsylvania will conduct examinations simultaneously in Philadelphia and Pittsburg, Dec. 16-19, 1902. Address Hon. James W. Lathe, Secretary of the Dental Council, Harrisburg, Pa., for application papers and further particulars.

Williamsport, Pa.

G. W. KLUMP, Sec'y.

Colorado State Board of Dental Examiners.

The Board of Dental Examiners of the State of Colorado will meet in Denver, Colo., Tuesday, Dec. 2, 1902, at 9 a. m., for examination of applicants for license to practice dentistry in Colorado.

In addition to written and oral examination, applicants must supply

their own patients, instruments and materials, and come prepared to do practical work under the supervision of the Board, which will pass upon suitable selection of cavities.

All applications must be completed prior to Dec. 2.

For application blanks and information address,

H. F. HOFFMAN, Sec'y,
611 California Bldg., Denver, Colo.

First District Dental Society of Illinois.

At the twentieth annual meeting of the First District Dental Society of Illinois, held at Rock Island, Sept. 23 and 24, the following officers were elected for the ensuing year: President, Claude B. Warner, Avon; Vice-President, A. I. Sargent, Galesbury; Secretary, H. W. McMillan, Roseville; Treasurer, L. W. Skidmore, Moline. The next annual meeting will be held at Macomb.

Roseville, Ill.

H. W. McMILLAN, Sec'y.

